SURGERY OF THE URETER:

AN HISTORICAL REVIEW.

(1585-1905)

BY

BENJAMIN MERRILL RICKETTS, PH.B., M.D., LL.D.

MEMBER AM. MED. ASSN.; WESTERN SURG. AND GYN. ASSN.; INT. MED. CONG., 1887; INT. ASSN. RAILWAY SURGEONS; MISS. VALLEY MED. ASSN.; CINTI. ACAD. OF MED.; OHIO STATE MED. SOC.; AM. PROCTOLOGIC SOC.; HON. MEM. MED. SOC STATE OF N. Y.; HON. MEM. ST. LOUIS MED. SOC.; FELLOW NEW YORK STATE MED. ASSN.; MEM SOCIETE INTENATIONALE DE CHIRURGIE; AM. UROLOG. ASSN. AND PAN. AMER. CONG.

CINCINNATI,

1908.

PREFACE.

The object of this review is to place the Bibliography in the most available form. This has necessitated careful consideration of a great many valuable papers; many of equal importance have not been mentioned except in Bibliography, while others were not available.

It was not supposed in the beginning that the literature was so varied or voluminous and by reason of it being so the work has been delayed.

By publishing it as a serial in the St. Louis Medical Review, it will have reached the hands of many practitioners, both general and special, and the indices of Journals and Libraries.

That it may become more useful three hundred reprints have been bound for a few of those who are more especially interested in the subject.

BENJAMIN MERRILL RICKETTS.

N. W. Cor. Fourth & Broadway,
CINCINNATI, O.

May 20, 1908.

INDEX.

Chapter I—Anatomy—1585-1905 1-9
Chapter II—Anomalies—1691-1905 10-36
Chapter III—Physiology—1830-1905 37-38
Chapter IV—Experimental—1818-1905 39-42
Chapter V—Surgery.
(*a*) Ureterectomy—1847-1906 43-49
(*b*) Ureterolithotomy—1800-1905 50-64
(*c*) Ureterorrhaphy—1832-1905 65-66
(*d*) Uretero-ureteral Anastomosis—1891-1905 67-68
(*e*) Uretero-colon—1888-1905 69-76
(*f*) Uretero-vesical—1886-1905 77-86
(*g*) Miscellaneous—1841-1905 87-116
Chapter VI—Diagnosis Catheter & Cystoscope—1875-1905. 117-159
Chapter VII—Prolapse—1862-1905 160-165
Chapter VIII—Occlusion—1750-1905 166-180
Chapter IX—Calcus—1820-1905 181-193
Chapter X—Cysts—1834-1905 194-196
Chapter XI—Rupture—1837-1905 197-205
Chapter XII—Fistula—1856-1905 204-205
Chapter XIII—Tuberculosis—1844-1905 206-208
Chapter XIV—Benign Neoplasms—1827-1905 209-210
Chapter XV—Malignant—1830-1905 211-216
Chapter XVI—Pathology—1616-1905 217-231
Personal Bibliography—1882-1908 232-244

THE SURGERY OF THE URETER:

A Historical Review.
(1585-1905).

By BENJAMIN MERRILL RICKETTS, Ph. B., M. D., LL.D.,
CINCINNATI.

Chapter I.

ANATOMY.
(1585-1905).

The ureter is the cylindrical, excretory duct of the kidney, of the size of a goose-quill, twelve or fourteen inches long, extending from the pelvis of the kidney to the base of the bladder, into which it opens by a constricted orifice after passing obliquely for nearly an inch between its muscular and mucous coats; it has a fibrous coat continuous with the capsule of the kidney, and the fibrous tissue of the bladder; a muscular coat, composed of an outer, circular, and an inner, longitudinal, layer, with an additional thin external longitudinal layer in its lower part; and a mucous coat presenting longitudinal folds and lined with transitional epithelium.

It passes obliquely downward beneath the peritoneum, resting upon the psoas muscle, the right ureter lying close to the outer side of the inferior vena cava, over the iliac arteries, behind the ileum on the right side, and the sigmoid flexure on the left; enters the posterior false ligament of the bladder in the male, with

the vas deferens, between it and the bladder and enters the bladder obliquely about one and one-half inches behind the prostate, and two inches from its fellow; in the female it lies behind the broad ligament, and passes along the upper part of the vagina, and the side of the cervix uteri, being about one-half of an inch distant from the latter.

The blood supply of the ureters is derived from the renal, spermatic or ovarian, and vesical arteries.

The nerve supply of the ureters is derived from the renal, spermatic or ovarian, and vesical plexus.

The following articles on anatomy have been written ,and the bibliography appended.

S. Albertus, in 1585, first described the anatomical structure of the ureter; P. M. Dilthey, in 1723, described, in a dissertation, rare observations on the valves of the ureters. In 1723, researches were made and published on the valves of the ureters. Guigneux, in 1760, reported on anatomical observations on the ureter; also J. C. Pohl, in 1772, reported on anatomical observations of the ureter. C. Bell, in 1812, before the Medico-Chirurgical Society of London, reported an account of the muscles of the ureters and their effects in the irritable states of the bladder. Dr. Bell says, "I am about to describe a set of muscles which seem not to have been observed by former anatomists. They are attached to the orifices of the ureters, and are seated in the bladder. In health, they are the instruments of a very peculiar organic action, and in disease the cause

of most distressing complaints." He follows with a short historical review of the opinions respecting it, as follows: "Morgagni expresses himself as follows: At the points where the ureters terminate in the bladder, there arises from each of them a thick round compact fleshy body, which takes a direction towards the orifice of the bladder. These two bodies having proceeded a little way, are united, and proceed forward, terminating in the caput gallinaceum." Santorini gives the same description of these parts as Morgagni has delivered.

Lietaud describes these bodies under the term *La trigone de la vessie.* The learned Portal is incorrect in saying that Lietaud was the first anatomist who has given their description.

Portal has thus described the trigone: "At the lower part, the internal tunic of the bladder adheres to a triangular body of cartilaginous hardness, and this body is always prominent in the cavity of the bladder, especially in old men." He proceeds to say, that, at the extremity of the triangle, backwards, the orifices of the ureters open; and at their anterior extremity, there is an eminence slightly protuberant, to which Lietaud has given the name of luette.

"The excellent anatomist, Domenico Santorini (in his second table) has accurately represented the Luette and Trigone. He has the following explanation on the letter 1. *"Vesicae urinae osculum cui prominulum corpus praefligitur quod in affectis vesicae sic*

prominet aliquando ut urinae iter prorsus intercludat". This refers to the disease with which Mr. Hunter and Mr. Home have made us familiar.

Sabatier adds: "The trigone and luette are the most sensitive parts of the bladder; which cause extreme irritation when a stone lodges here, while if it lodges in any other part of the cavity of the bladder, it causes little inconvenience." Sabatier says, "The uvula luette which terminates the anterior angle, is very liable to swell, and then it rises in the form of a round tumor which fills the neck of the bladder, and opposes itself to the flow of urine."

In Haller's Elementary Physiology, Tome v, p. 328, we have a description following that of Morgagni under the title *Colliculi ab ureteribus in Urcthram producti.*

"Mr. Hunter has described a small portion of the prostate gland which lies behind the very beginning of the urethra; and this he describes as subject to swell out like a point into the cavity of the bladder, where it acts like a valve on the mouth of the urethra. This can be seen, even when the swelling is not considerable, by looking upon the mouth of the urethra from the cavity of the bladder. It is impossible to mistake this; the swelling he describes is the uvula vesicae or luette of Lietaud. Morgagni has very fully described the part of the prostate gland which Mr. Hunter mentions, and which he discovered to be the seat of this dangerous malady.

"The use of these muscles is to assist in the

contraction of the bladder, and at the same time to close and support the mouths of the ureters. The surface of the bladder where it covers their union on the inside, is endowed with an exquisite sensibility, which is a provision of Nature, for their ready and instantaneous action on the stimulus to pass urine. It is here that is seated that sensibility which produces the natural call to urinate, and here also is the seat of diseased irritations.

"It will be observed that the orifices of the ureters are not closed by the contraction of the muscular fibres around them. They are defended against the return of the urine by the obliquity of their passage through the coats of the bladder. It is well known that the extremity of the ureter enters through the coats of the bladder obliquely, and that in consequence of this, there is a valvular action in the coats of the bladder, which prevents the regurgitation of the urine into the ducts of the kidney."

Civiale, in 1835, reports on the Neuralgias of the Ureters and Vessels; Broca, in 1850, reports on the Anatomy of the Ureters; Pettigrew, in 1867, reports on the Muscular Arrangement of the Bladder and the Prostate, and the manner in which the ureters and urethra are closed; English, in 1874-5, reports on the Anatomy and Pathology of the Ureters; Tuchmann, in 1874, reports on the Fundus Vesicae in Man, anatomically and physiologically considered. Dogiel, in 1878, reports on the Nerves of the Ureters; De Paoli and Buscachi, in 1888, report on the Ureters; Panta-

lone, in 1888, reports on the Pelvis of the Ureters in Females, anatomically considered; Holl, in 1882, on the Topography of the Ureters; Dogiel, again in 1896, gives contributions on the Anatomy and Physiology of the Ureters; Pettit, in 1897, on the Pelvis of the Ureters; Wertheim, in 1901, gives clinical considerations of the Ureters; Deaver, Surgical Anatomy (1899), on the Prleters; Henry Morris, in 1901, in two volumes on Surgical Diseases of the Kidney and Ureter including injuries, malformations and misplacements; H. A. Kelly, in 1902, on the Structure of the Ureter; Altuchow, in 1903, on the Topography of the Ureters.

BIBLIOGRAPHY.

Albertus, S.—Structura ureterum renis dextri mirifica. In his Tres Orationes Norimbergae, 1585, sig. L 4 b L.

Dilthey, P. M.—Dissertatio sistens observationum rariorum de valvulis in ureteribus repertis, (Hallae) Magdeb, 1723.

Ausgefundenen (von) valvulis in ureteribus.—Sammlung v Nat. u med. Gesch., 1723. Leipzig u. Rudissin, 1724. xxiii, 343.

Gontard.—Observation sur des portions d'os sortis de l'uretre. Record Periodical d'observations de medecine, de chirurgie, et de pharmacie, Paris, 1757. vi, 107-114.

van Beckhoven de Wind, J.—De Ureteribus et vesica urinaria. Lugd. Bat., 1734.

Guigneux.—Observation anatomique sur un homme qui n'avoit qu'un rein et qu'un uretere. Journal de Medecine, de Chirurgie de Pharmacie, etc. Paris, 1760, xii, 348.

Pohl, J. C.—Observationes anatomicae de ureteribus. Lipsiae, 1772.

Bell, C.—Account of the muscles of the ureters and their effects in the irritable states of the Bladder. Medico-Chirurgical Transactions, London, 1812. iii, 171-190. 3 pl.

Ferrier, J. fils.—Procede mis en usage avec succes pour extraire une portion de sound d'argent engage dans la vessie et occupant une partie de l'uretre. Report Generale d'Anatomie et Physiologie Pathologique, Paris, 1827. iv, 179-181.

Civiale.—Sur les nervalgies de l'uretre et du col de la vessie. Gazette Medicale de Paris, 1835, 2nd. Series, iii, 449-452.

Broca, P.—Deux ureteres du rein gauche. Bulletin d. l. Societe Anatomie, Paris, 1850. xxv, 165.

Pettigrew, J. B.—On the muscular arrangement of the bladder and the prostate and the manner in which the ureters and urethra are closed. Philosophical Society's Transactions, London, 1867. clvii, 17-48. 3 pl.

von Luschka, H.—Topographie der harnleiter des Weibes. Archiv. f. Gynaekologie, Berlin, 1871-2, iii. 373-380, 1 pl.

Bouvin, M. J.—Oyer den bouw en de beweging der ureteres. Utrecht, 1869.

Englisch, J.—Zur Anatomie und Pathologie des Ureters, insbesondere inbezug auf Hydronephrose. 1874-5, 48; 73.

Tuchmann.—Ueber den kunstlichen Verschluss der einen Harnleitermundung. Ein Beitrag zur Anatomie und Physiologie des fundus vesicae bei Mann. Deutsche Zeitschrift f. Chirurgie. Leipzig, 1874, v, 62-94.

Hoffmann, C. E. E.—Ueber einige Bildungsfehler der Ureteren. Archiv. f. Pathologische Anatomie, etc., Berlin, 1877. lxxi, 408.

Weigert, C.—Nachtrag zu def Aufsatze ueber einige Bildungsfehler der Ureteren (Band lxx) und Erwiderung auf die Bemerkung des Herrn. Prof. Hoffmann zu (obigem) Aufsatze (Band 71 S. 408). Archiv. f. pathologische Anatomie, etc., Berlin, 1878, lxxii, 130.

Dogiel, A.—Zur Kenntniss der Nerven der Ureteren. Archiv. fuer mikroscopische Anatomie, Bonn, 1878, xv, 64-66, 1 pl.

Rivolta, R.—Metodo facile per l'allacciatura degli ureteri negli uccelli. Gior. di anatomia Fisiologia e Patologia d Animali. Pisa, 1881, xiii, 241-247.

De Paoli & Buscachi.—La greffe des ureteres dans un point anormal de la vessie. Annales des Maladies des Organes Genito-Urinaires, Paris, 1888, vi, 553-559.

Pantaloni, J. A.—La portion pelvienne des ureter-

es chez la femme. Considerations anatomiques, Paris, 1888.

Holl, M.—Zur Topographie des weiblichen Harnleiters. Wiener medicinische Wochenschrift, 1882, xxxii, 1325; 1357.

Baumm, P.—Ein Fall von drei Harnleitern. Archiv. f. Gynaekologie, Berlin, 1892. xlii, 329-338.

Margarucci, O.—Ricerche sulla circolazione propria dell' uretere. Policlinico, Roma, 1893-4, i, 321-324.

Disselhorst, R.—Der Harnleiter der Wirbeltiere. Anatomische Hefte, Wiesbaden, 1894, iv, 127-191, 3 pl.

Margarucci, O.—Ricerche sulla circolazione propria del' uretere. Atti d. xi Congresso di Medicina Internazional., 1894. Roma, 1895, iv, Chirurgia, 163-566.

Dogiel, J.—Contributions on the anatomy and physiology of the ureters. Gazette Lek Warszawa, 1896, 2nd. Series, xvi, 1213-1217.

Petit, P.—Les rapports pelveins des ureteres chez la femme. Gazette medicale de Paris, 1897, 10. s. i, 532.

Waldeyer.—Bemerkungen ueber die Lage des Ureter. Verhandlung d. anatomische Gesellschaft, Jena, 1897, 18-21.

Gage, S. H.—Relation of the ureters in the cat to the great veins, with variations. Proceedings of the Association of American Anatomists, 1897, Washington, 1898, x, 126.

Deaver.—Surgical Anatomy, 1899.

Wertheim, E.—Beitrag zur Klinik der uberzahligen Ureteren beim Weibe. Zeitschrift f. Geburtshulfe u. Gynaekologie, Stuttgart, 1901, xlv, 293-299. 1 fig.

Morris, H.—Surgical diseases of the kidneys and ureters. 1901.

Kelly, H. A.—Structure of the Ureter. Journal American Medical Association, 1902, xxxix, 363-368, 2 fig.

Altuchow.—Topographische Lage der Ureteren. Monatsblatt f. Urologie, Berlin, 1903, viii, 193-233.

Robinson, B.—Tunica muscularis ureteris. Denver Medical Times, 1903-4, xxiii, 376-380.

Robinson, B.—The ureter and rectum in distended and dried specimens. New Albany Medical Herald, 1903-4, xxi, 441-443.

Zondek.—Zur Anatomie der Ureteren in ihren

Bedeutung fur die Nierenchirurgie. Verhandlung d. deutschen gesellschaft fur Chirurgie, Berlin, 1903, xxxii, pt. i, 190.

Robinson, B.—The general course of the ureter. Canadian Journal of Medicine and Surgery, Toronto, 1904, xv, 318-327.

Robinson, B.—Peritoneal cord of the ureter. Oklahoma Medical News Journal, 1904, xii, 6-12.

Robinson, B.—The proximal ureteral extremity. American Journal of Dermatology and Genito-Urinary Diseases, St. Louis, 1904. viii, 14-25.

Robinson, B.—The tunica mucosa ureteris (Ureteral mucosa). St. Louis Medical Review, 1904, i, 273-278.

Robinson, B.—Special topography of the ureter and tractus vascularis. Medical Brief, St. Louis, 1904, xxxii, 65; 149; 231; 305; 404; 449; 603; 705.

Robinson, B.—The form of the ureter from paraffin casts. Kansas City Medical Record, 1904, xxi, 2-5.

Robinson, B.—The calibre of the ureter, the ureteral isthmuses, constrictions or sphincters. American Practitioner and News, Louisville, 1904, xxxviii, 705-710.

Robinson, B.—The circulation of the ureter. Annals of Gynaecology and Paediatry, Boston, 1904, xvii, 484-490.

Robinson, B.—Special topography of the ureter and tractus vascularis. Medical Brief, St. Louis, 1904, xxxii, 65-69.

Robinson, B.—Paraffin distended ureters, demonstrating the ureteral isthmuses and constrictions; 21 from human, 1 from beaver. Medical Standard, Chicago, 1905, xxviii, 60.

Robinson, B.—The form of the ureter; (A) isthmuses (B) dilatations. Medical Age, Detroit, 1905, xxiii, 201-212.

Chapter II.

ANOMALIES.

(1691-1905.)

Congenital anomalies of the ureters are many, as shown by the numerous reports beginning with Hartmann, 1690. There may be more than one originating in the kidney, or there may be none at all.

Each kidney may have one or more ureters uniting to form one common channel to enter the bladder, or the ureter from one may enter the bladder upon the opposite side.

Several ureters may enter the bladder or they may unite to form one common duct to enter the bladder, the peritoneal cavity, or any part of the alimentary tract; or they may make their exit upon the surface of the body, as reported by Duncan, 1805. They may be extremely short or long or small or large in diameter, and accompany each other to the bladder in close proximity.

Hartmann, in 1690, reported anatomical monstrosities of the ureters; Tyson, in 1685, four ureters in an infant; Delius, 1748, on duplex ureter; Duncan, in 1805, reports the following cases of malformation; the first subject consists in the absence of the anterior portion of the urinary bladder, while the posterior portion is protruded forward through the muscles and integuments which commonly cover it, so that the ureters open externally,

and there is a constant involuntary discharge of urine through them. In a case described by Blasius there was but one external aperture, as the ureters united before they penetrated the bladder. Duncan says that Nature seems to have sometimes made other attempts to supply the want of a bladder, either by lengthening the ureters, or by enlarging them so much in particular parts as to resemble small bladders. He also reports a case of Astley Cooper's of a fungous tumor on the lower part of the abdomen, through which the urine was involuntarily discharged, in a female, aged 22 years, having existed since birth, death four days after admission to hospital. Upon necropsy the ureters, which opened through the lower part of the fundus, were uncommonly large and had served the purpose of reservoirs. Renauldin, in 1818-19, reports on the anatomy of organic lesions of the kidneys accompanied by numerous calculi and anomalies; Rufz, in 1833, on the situation of arteries in the ureters; Lediberger, in 1834-5, on double ureter; Webster, in 1834-5, on congenital enlargement of the ureters, with post mortem; Lever, in 1848-50, exhibited a foetal kidney with cystiform disease with absence of ureters; Hargrave, in 1848, reported on a curious abnormal condition of the kidneys, ureter, and bladders; Parcher, in 1858, reported a case in which the third lumbar vertebra had its place supplied by a thin cartilage having an opening through which passed two ducts or ureters which supplied the cyst with water, no ureters connecting with the bladder;

Lemarchant, in 1861, reported a case of double ureter; Ferrand, in 1862, reported on anomalies of the kidney and ureter; Pollock, in 1864-5, reported on a kidney (left) and its secreting substance, which had almost wasted entirely, owing probably to the opening of the pelvis into the ureter not being at the apex of the pelvis, but at one side, so as to give rise to a sort of valvular aperture, very unfavorable to the passage of urine, the patient, a female, aged 39 years, dying of bronchitis and gangrene of the lung; Bruce, in 1866, exhibited a case of complete absence of the ureter, and even the ridge bounding the trigone of the bladder (on which the ureter normally opens) on the side on which the kidney was found wanting, in a male aged 49 years, death occurring from accidental injury; there were no symptoms of renal affection during life. Fagge, in 1866, reported on a left kidney in which the ureter lay in front of the renal artery and vein at the hilum, and not behind them. Baker, in 1878, says he has been surprised to see how few refer to abnormalities of the ureters in any way, except to mention the fact that cases of double ureters are sometimes met with, and he has failed to find in any such book a description of malposition of the ureters where the bladder was present, or in any other than a rudimentary condition, except that in one the fact is noted that the ureters sometimes terminate in a cul-de-sac. Thus, in Mickel's Anatomy we find "The congenital anomalies of the ureters are: first, their absence; second, their imperforation in

one or several points, from an obstacle; third, their plurality." Again, in Andral's Anatomy: "We sometimes observe cases of malformation of the ureters. Thus, they have been found united by a transverse duct. Again, two ureters may pass from the same kidney, and either open separately into the bladder, or unite before entering it. The latter is generally the case. When the bladder is wanting, or exists only in a rudimentary state, the ureters terminate in some other part. Thus, they have been known in such cases to open: 1, into the umbilicus; 2, the rectum; 3, the vagina; 4, the urethra; and nearly the same facts are mentioned in the Dublin Dissector."

Cruveilhier's Anatomy, Vol. 1, refers to the subject in the following way: "The ureter is generally single on each side, but sometimes double, and that under very different circumstances; for example, when the two kidneys are united into one, a double ureter is almost invariably found; and secondly, when, there being two kidneys, one of them is divided into very distinct portions. In the latter case, the two ureters are often united into one, after a course of a few inches."

Dr. Baker reports the following findings, postoperative, in a case of supposed fistula from the ureter. "Under ether, an incision made through the vaginal membrane down upon the probe 1½ inches from the meatus, found that instead of cutting into a fistulous tract, we had opened a ureter, from which the urine now flowed drop by drop as it had from

the minute orifice by the side of the meatus. A No. 7 uterine probe could now be passed, which was the length of the instrument, up the course of the left ureter. From the point of incision this ureter was now easily dissected out, which was done for a little more than an inch forward and a portion of the way outward. It was then decided to turn the course of this ureter into the bladder as near the point where it should have gone as possible. Dissecting up the vaginal membrane to the left of the median line at a point 1 inch from the internal orifice of the urethra, the bladder was punctured, the ureter was then cut off, enough being left to go through the thickness of the bladder, that the tension might not be too great upon the ureter. The edge of the ureter was then stitched to the lining membrane of the bladder all around the incision through that viscus, vaginal wound closed. A uterine probe passed through the urethra into the bladder could be conducted several inches up the ureter." Dr. Baker further considers the early development of the ureters and kidneys to see, if possible, how some of these abnormalities occur.

According to Kuppfer, *Archiv. f. mikroskop. Anat. Bonn.*, 1866, *vol. ii, p.* 473, (and confirmed by a number of other observers, including Waldeyer), in the lowest class, or amphibia, the Wolffian body directly bears the hollow bud which gives the foundation of the permanent kidney, while in the upper classes the duct from the Wolffian body gives rise to a second or renal canal from which the bud-

ding formation takes place. This quite agrees with Foster and Balfour Elements of Embryology, p. 163, in their observations on the chick, the result of which was that, between the eightieth and one-hundredth hour of incubation, the permanent kidneys began to make their appearance, the first portion of them to appear being their duct. Near its posterior extremity the Wolffian duct became expanded, and from the expanded portion a diverticulum was constricted off, which was the duct of the permanent kidney, or ureter. The ureter and Wolffian duct, which at first opened by a common trunk into the cloaca, by the sixth day had independent openings. From the upper end of the ureter, diverticula were given off at right angles into the intermediate cell-mass. These lengthening and becoming twisted, formed the tubuli uriniferi, while the mesoblast around their extremities became directly converted into the Malpighian bodies and the capillary network of the kidneys. The formation of the kidneys took place before the end of the seventh day. Dr. Beumer has collected the records of 48 cases recently published in Virchow's Archiv in which one kidney, and in nearly all the corresponding ureter, was absent, and that this number of cases occurred within twenty-five years, shows that this abnormality is not so extremely infrequent. Dr. Rayer, in his work on Diseases of the Kidneys, 1841, mentions a case where there were neither ureters nor kidneys to be found but the calibre of the umbilical vein greatly exceeded that usual in adults. Dr.

Bouilland, *Journal Complementaire*, July, 1828, refers to a subject where there was but one kidney situated across the spine, furnished with two ureters; unfortunately the terminus of the ureters was not given. Dr. Cutler presented to the Boston Society for Medical Improvement, April 22, 1878, the specimen of an absent kidney and ureter on the left side. Dr. Beach presented to the Pathological Society of London the case of a five year old child having a third ureter filled with pus, opening below into a pouch near the bladder. Dr. Emmet reported a case where one of the ureters discharged into the upper part of the vagina beside the cervix uteri. Dr. Davis presented to the Museum of the Royal College of Surgeons, Ireland, a case of acephalous foetus; the ureters, particularly the right one, were remarkably dilated, and elongated, then formed two great tortuous tubes, resembling pieces of large intestines as to size, and presented in several situations very close constrictions, and in others complete obliterations. The right tube had no communication with the bladder, the latter was much enlarged and misshapen. The following reports of double ureters were considered: Dr. Bouilland, *Journal Complementaire*, July, 1828, in a subject where two ureters proceeded from the right kidney, and at the termination of about two inches united in one canal; the left kidney was natural. Dr. Thompson, *Medical Times and Gazette*, 1855, showed a specimen of the ureter which was double for a length of about two inches and the chambers of the pelvis did

not communicate; the organ was not diseased.

Dr. Dowling, *London Lancet*: a case on the left side, the ureter arose double, becoming coalesced, however, about 2½ inches from the kidney, from which point it continued on in one canal emptying into the bladder by one orifice.

Dr. Smith, *Dublin Journal Medical Sciences, vol. lvii,* reports a case where there was a double ureter, the union of the two tubes taking place at a distance of about 4½ inches from the kidney.

Dr. Wiegert, *Virchow's Archiv, Bd. lxx, Hft. iv,* reports a case where the left kidney gave off two ureters, which united together at an acute angle after a separate course of about 15 cm. and opened into the bladder in the usual place. Each ureter corresponded to a pelvis of the kidney, so that there was an upper and a lower one; the two pelves were seperated by a thick layer of kidney, yet so that one could not remark the boundary of the two territories of pelvis from the outside. The diameter of the ureters, when slit up, averaged 1 cm. in the ununited as well as in the united portions.

Prof. Barbosa, *Gazette Medica de Lisbon,* 1860, observed the following anomaly in a body: Two distinct ureters existing on the left side, entering the bladder by two distinct orifices. The left kidney was longer by 3 cm. than the right, and the two ureters at their origin in the fissure were each provided with a separate pelvis, the united capacities of which only equaled that which would be required by

a kidney of this size. The two canals, separated from each other by about 3 cm. at their origin, pursued their normal course one before the other. At about 5 cm. from the bladder they united into a single cord, which traversed its muscular tunic. Careful dissection, however, showed this to be only apparently so, each opening into the bladder distinctly about one or two millimetres from the other. During the last 2 cm. of their course, the contiguous walls of the two tubes were so blended together as to constitute one.

Dr. Allen recently observed an elongation of the organ (kidney) and its being furnished with two ureters which took their origin from the upper and lower portion of the hilum, at a distance of about one inch apart and gradually converging, entered the bladder within about ⅛ inch of each other. (*Phila. Med. Times, vol. iv,* 1874). Dr. Baker concludes as follows:

"1. The ureter may naturally be so misplaced as to give rise to the most troublesome symptoms. foremost of which stands incontinence of urine.

2. In cases where the ureter is so misplaced, it is possible to overcome the difficulty by surgical interference.

3. It is not absolutely essential to the life of an individual that either kidneys, ureters, or bladder exist, as shown by the case of Rayer reported.

4. Contrary to the opinion of most writers, and substantiated by the 48 cases reported by Brunner, where one kidney is absent the

remaining one is not always enlarged, as shown by the case of Dr. Cutler reported.

5. Where the ureters arise double, they are usually given off, one from the upper, the other from the lower part of the kidney, the pelves being distinct and separated by the proper structure of the kidney.

6. Where a ureter terminates in some other part than the bladder, that viscus may be present and well developed, notwithstanding most authorities state the contrary.

7. In most of the foregoing cases the malformation of the ureters was unaccompanied by any troublesome symptoms, and the interesting defects were only discovered at the autopsy.

8. In three of the preceding cases the malformation was discovered during life, having given rise to incontinence of urine by the ureters discharging either by the side of the meatus or into the vagina."

Josias, in 1879, reported a case of congenital absence of the kidney and ureter. Davies-Colley, in 1879, reported a specimen of malformation and disease of the ureter and bladder in a female child eighteen months. Josso, in 1879, reported on anomalies of the ureter; Josso, also in 1879, reported on double ureter. Wilcox, in 1880, reported a remarkable instance of periodic obstruction of a ureter in a solitary kidney. Smith, in 1882-3, reported a case of Bright's disease and urinary calculi with anomalous course of the right ureter and of entrance of the urethra. McDowell, in 1883, reported a case of abnormal course of

the left ureter. Richmond, in 1884-5, reported on abnormal ureters. Davies, in 1885, reported on enteric fever associated with recent syphilis, death, absence of left kidney and ureter. Fox, in 1885, on meningocerebritis necropsy, absence of the left kidney and ureter. Davis, in 1885, reported a case of anomalous ureter. Fenwick, in 1885-6, reported a case of atresia of vesical orifice of left ureter (congenital). Moore, in 1888, reported a case of congenital narrowing of both ureters with dilatation of the kidneys and perinephritic inflammation due to injury. Jackson, in 1888-9, reported a case of cystic degeneration of the kidneys with two ureters. Davenport, in 1890, on a case of incontinence of urine due to malposition of the ureter. Poulalion, in 1890, reported a case of congenital fusion of a renal mass situated uniquely vertically in the lumbar region, upright existence of the same organ with two basins and two ureters, three groups of vascular arteries and veins. Chambers, in 1891, reported a case of anomalous ureter. Westmacott, in 1891-2, reported a kidney with double pelvis and ureter. Auscher, in 1892, reported a case of congenital absence of the right kidney and corresponding malformation of the ureter. Noel, in 1892, reported a case of congenital absence of the kidney and ureter. Spaletta, in 1895, a case of incomplete duplication of the ureter. Colzi, in 1895, contributed to the study of anomalies of the ureter. Soulie, in 1895, reported a case of double ureter in a human foetus. Ramsey, in 1896, reported a case of complete duplication

of the left ureter from the kidney to the bladder. Bulmer, in 1896, reported notes on two cases of ureteral abnormality. Obici, in 1896, reported on anomaly of the ureter. Meslay, in 1896, reported on prostatic double ureter. Brinon, in 1896, reported on congenital dilatations of the ureter. Jolly, in 1896, reported a unique case of duplicate bilateral ureters and multiple renal arteries. Fullerton, in 1897, reported a case of duplication of right ureter. Lennander, in 1899, reported on pyonephrosis extirpated from right kidney with two pelves and two ureters. Miller, in 1901, reported an anatomical deviation of the kidney and ureter. Laurens, in 1901, reported on incomplete duplicate bilateral ureters. Theuveny, in 1902, reported on the absence of right ureter with anomalies. Janeway, in 1902, reported a case of double ureter on each side pervious throughout. Bonnet, in 1903, reported on obliteration of the ureter by a congenital valvule. Gould, in 1903, reported that anomalies of the ureters of both kidneys were comparatively rare, and that complete duplication of both ureters was very rare; he reported two more cases in addition to the only eight cases in literature of complete bilateral duplication of the ureters. In one case a child aged six months, each kidney had two pelves and two ureters, which were separate throughout their length, each having its own orifice in the bladder. One ureter on each side had its orifice apparently in the normal position, while the other two ureters had their orifices nearer to the median line and neare

the prostatic urethra. One of the two pelves of each kidney was larger than the other. The kidneys proper were not remarkable. The other case, a woman aged fifty years, each kidney had two ureters and two pelves. The pelvis draining the inferior half of the left kidney was somewhat larger than that draining the superior half, the pelves of the other kidney were of about equal size. The two ureters of each kidney were separate and patent throughout and each had its own orifice in the bladder. All four ureters were of equal size and of a diameter somewhat smaller than normal. The orifices of the ureters of the right kidney were situated near, but apparently above, the situation of the normal right ureteral orifice, and were about 7 mm. apart. The ureter from the inferior half of the right kidney had its orifice further from the median line. The orifices of the ureters of the left kidney were about 2 cm. apart. The orifice of the ureter which drained the inferior half of the left kidney was situated apparently a little above the situation of the normal ureteral orifice, while the orifice of the ureter draining the superior half of the left kidney was nearer the prostatic urethra. The right ovarian vein emptied into a large branch of the renal vein instead of into the vena cava. No special anomaly of the main renal artery was noted. The kidneys were 12½ and 13 cm. long respectively.

H. Silver (my student), in 1905, at autopsy found two ureters with independent openings in the right kidney, and extending to the blad-

der, into which they entered with but one opening. The ureter upon the left was normal. (Personal communication, B. M. R.)

Byron Robinson, 1904 (*Medical Fortnightly* p. 145). On the distal termination of complete duplicate ureters says: "The termination of the ureter is in the tractus urinarius.

1. The most usual termination is in the bladder.

(A) The chief location of the distal ureteral orifice in the bladder is in the trigonum vesicae.

(a) In the trigone the multiple ureteral orifices are situated in an oblique dorsoventral line closely adjacent, or in other words, one is situated directly over the other in close proximity. This occurred in the majority of the specimens.

(b) The multiple ureteral orifices may be situated closely adjacent, however, more in a transverse line. This occurred in a few specimens.

(c) In multiple ureters the one ureter may have its exit in the normal trigonal location and this is most frequently the distal ureter, while the vesical orifice of the proximal ureter is in most cases located medianward and distalward to that of the distal ureter.

(d) In complete duplicate ureters the trigonal orifice of the proximal ureter has its exit distalward and medianward to that of the distal ureter. This is of practical importance in ureteral catheterization and surgical intervention.

(e) In complete bilateral duplicate ureters

the location and distance of the vesical orifices from each other and the opposite sides may not correspond. They vary but have their exit mainly in direct axis.

(B) In complete duplicate ureters the exit has been reported to be located in the vesica urinaria external to the trigone; however, it did not occur in any of our 11 specimens.

Blind or caecal ending ureters.

2. The distal ureteral orifice may terminate in the urethra.

(a) In the prostate; six authors report cases.

Erlach (1888) reported a case in which the right ureter was duplicate. One ureter opening normally in the bladder and the other in the urethra immediately distal to the orificium urethrae internum, demonstrated at the necropsy. There was no history of incontinence. This class includes such cases as Wrany's (1870), where the ureter opened into the trigone opposite the urethra; also Wrany's case in which the ureter opened into the neck of the bladder, as well as Zaluska's case (1869) where the ureter opened 1-10 of an inch proximal to the border of the caput gallinaginis. Civiale (1843) reported a ureteral opening adjacent to the verumonatum. Walter (1800) mentions a case where the ureter opened closely adjacent to the caput gallinagins. Weigert (1876) and Bostreom (1884) report that ureters opened near the colliculus seminalis. Hoffman (1827) reported a case of a ureter opening on the side of the colliculus seminalis. Lillienfield (1856) reported a

case in which the subject a man sixty-five years of age dying of typhoid fever, had a duplicate right ureter and the proximal ureter ended blind closely adjacent to the caput gallinaginis.

3. The ureter may terminate in the mesonephros—the second ureter or Gartner's duct. Tangl reports a case.

4. It may terminate in the allantois. La Goutte reports a case.

The ureter may terminate in the tractus genitalis.

1. It may terminate in the vagina.

The ureter may terminate in different localities of the vagina. Dr. F. H. Davenport (1890) observed a case in which the ureter opened in the dorsal wall of the external urethral orifice. Dr. W. F. Baker (1878) reported a case in which the ureter had its exit about two lines to the left and distal to the urethral orifice. There is no mention whether either of the above ureters was duplicate. Baum reported a case where one of the duplicate ureters had its exit closely adjacent to the orificium urethrae externum; the other ureter opened into the vesica urinaria. F. Tangl reported a case of a woman sixty-seven years old with a partial duplicate right ureter which ended as a caecal or blind canal on the ventral make a fist on the right, that a little encourvaginal wall. There was a bilocular uterus with a single cervix. The left kidney was extremely atrophic, the right had chronic interstitial nephritis. Emmet, Depaul, and Albarren report cases.

2. It may terminate in the pudendum.

Walter, Kolisko, Elach and Welsei report cases. Massari (1879) reported a case of a four year old child with a preternatural anus where the left ureter had its exit immediately distal to the prepuce of the clitoris. The renal organ was a fused or horseshoe kidney; the right ureter was normal. The child suffered constant urinal leakage, the vagina was duplicate, uterus normal; demonstrated by autopsy.

3. It terminates in the uterus, Foster and Wrany report cases.

4. It may terminate in the oviduct.

5. It may terminate in the vesicula seminalis. Effinger, Hoffman and Weigert report cases.

The ureter may terminate in the tractus intestinalis.

It may terminate in the rectum. The termination of the ureter in the rectum is liable to accompany malformations incompatible with life. Olshausen reports a case where the intestine, uterus, bladder and the ureter opened into a cloak closed by skin. Morris reports the ureter of a child opening into the rectum.

Decherd reports a case of complete bilateral duplication of the ureters in a male negro who died of amoebic dysentery. Dissection of the pelves and calices show that the upper ureter drains the upper third of the kidney while the lower one drains the lower two-thirds. The upper ureter drained less of the kidney than the upper segment of the bifid pelvis. The two upper ureters opened into the

bladder by the two mesial orifices, the lower ones by the two external.

Harbinson reports a case of double ureter in a female about sixty years of age who had died of phthisis. Kidneys larger than usual, quite healthy and normally placed. From each kidney ran two ureters with separate pelves attaching them to the kidneys. The pelves were situated, one superiorly to the other, and on making a section of the kidneys no communication was found between them. The blood vessels divided so as to give a separate blood supply to the parts of the kidneys drained by the separate pelves. On the right side the ureters ran gradually approaching each other and apparently becoming one at 5 inches distance from their origin; however, on dissecting them apart, it was found that they ran separately in a common connective tissue sheath for a further couple of inches. Just before reaching the pelvic brim they became one and ran into normal course to the bladder. On the left side the two ureters ran separately to near the pelvic brim; from this point they ran side by side, invested in a common sheath to the bladder, the wall of which they entered in the normal position. On making an opening in each and passing a fine probe it was found that both continued separate through the bladder wall and opened into this viscus by distinct openings. The posterior opening corresponded to the normal one, forming with that of the other side and the urethra, the triangular "trigone" of the bladder. The anterior one was placed in the line of the side

of the triangle one-third of an inch nearer the urethral opening. I may incidentally mention that in this body the caecum lay in the right side of the pelvis with the vermiform appendix in the right side of Douglas's pouch while the ileocaecal valve was in front of the right sacroiliac synchrondrosis; there was also a marked sigmoid hepatic flexure of the colon. In the *Journal Am. Med. Assn.*, 1904, *xlii*, Levison reports a case of bilateral duplication of the ureters in a male aged sixty-five admitted to the County Hospital, presenting symptoms and signs of advanced pulmonary tuberculosis; death ten days after admission.

Autopsy: From each kidney arise two fully developed ureters, each having a separate pelvis, but the two ureters on each side enter the bladder through a common orifice. The distance between the two ureteral orifices is considerably increased. One of the ureters passing from the right kidney is widely dilated throughout. At its beginning it is 4 cm. wide, becoming more narrow lower down, but still remaining three or four times the normal diameter of the ureter."

Remarks.—Judging from the number of cases of bilateral duplication of the ureters reported, the condition must be one of extreme rarity. Gould has recently found 8 cases in the literature, to which he adds two. Dechtel reports one case, making in all 11 cases previously reported. Unilateral duplication of the ureters is somewhat more common but still of sufficient rarity to be of interest.

BIBLIOGRAPHY.

Hartman P. J.—Anatome monstrosorum ureterum. Miscellanea Acad. Nat. Curiosa, 1690, Norimberg, 1691, Dec. 11 Ann. ix, 37, 1 pl.

Tyson E.—Four ureters in an infant. Philosophical Society's Transactions 1685-1700, London, 1731, iii, 146, 1 pl.

Delius H. F.—Ureter duplex. Acta Acad. Nat. Curios, Norimberg, 1748, viii, 379.

Duncan, A.—An attempt towards a systematic account of the appearances connected with that malconformation of the urinary organs in which the ureters instead of terminating in a perfect bladder open externally on the surface of the abdomen. Edinburgh Medical and Surgical Journal, 1805, i, 43; 152, 1 pl.

Reauldin.—Note sur une lesion organique des reins accompagnee d'un calcule volumineux et d'une anomalie anatomique. Bulletin de la Facultie de Medicine de Paris, 1818-19 vi, 367-370.

Rufz.—Rein seul situe a gauche du rachis de deux arteres et donnant naissance a deux ureteres. Bulletin de la Societe d'Anatomie, Paris, 1833, viii, 59.

Lediberder.—Uretere naissant du rein par une double origine. Bulletin de la Societe d'Anatomie, Paris, 1834-5, ix, 187.

Webster J.—Congenital enlargement of the ureters, fatal case of lithotomy—post-mortem. United States Medical and Surgical Journal, New York, 1834-5, i, 402-407.

Petrequin.—Rein droit pourvu de deux ureteres, rein gauche forme de deux lobes renfermant deux bassinets et garni de deux ureteres. Gazette Medical de Paris, 1837, p. 195.

Lever.—Foetal kidney exhibiting cystiform disease with absence of ureters. Transactions of the Pathological Society of London, 1848-50, ii, 74.

Hargrave.—Curious abnormal condition of the kidneys, ureter, and bladder. Dublin Medical Press, 1848, xix, 49.

Gouriet.—Inlegalite de volume, anomalie des arteres et des ureters. Bulltin d la Societe d'Anatomie, Paris, 1852, xxvii, 505.

Parcher S. F.—Third lumbar vertebra; its pla supplied by a thin cartilage having an openir through which passed two ducts or ureters whi

supplied the cyst with water, no ureters connecting with the bladder. Boston Medical and Surgical Journal, 1858, lviii, 13.

Lemarchant.—Un example d'uretere double. Bulletin de la Societe d'Anatomie, Paris, 1861, xxxvi 113-115.

Ferrand. Anomalie du rein et de l'uretere droit. Bulletin de la Societe d'Anatomie, Paris, 1862, xxxvii, 48.

Pollock J.—Case of wasted kidney from malformation of Ureter. Transactions of the Pathological Society of London, 1864-5, xvi, 181.

de Font-Reaulx.—Anomalie de l'appareil urinaire, quatre ureters completement independants. Bulletin de la Societe d'Anatomie, Paris, 1865, xl, 645.

Bruce A.—A solitary kidney, the bladder having but one ureter. Transactions of the Pathological Society of London, 1866, xvii, 175.

Fagge C. H. Kidney in which the position of the ureter at the hilum was abnormal. Transactions of the Pathological Society of London, 1866, xvii, 171.

Pilate.—Anomalie de l'uretere. Bulletin de la Societe d'Anatomie, Paris, 1867, xlii, 366.

Goerdts L. H. Ein Fall von doppelter Ureterenbildung mit beider Endigung des einen derselben, Kiel, 1867.

Zaluski.—Ein Fall von doppelten Harnleitern mit getrennten Ausmundung in der Blase. Greifswald, 1869.

Reverdin.—Absence du rein de l'uretere du canal deferent et de la vesicule seminale du cote gauche: existence des deux testicules dans les bourses. Bulletin. de la Societe d'Anatomie, Paris, 1870, xiv. 325.

Parznicki.—Un cas d'uraque remplissant le role d'uretere. Gazette medical de l'Orient, Constantinople, 1873-4 xvii 122-126.

Smith W. G.—Congenital absence of ureters. Proceedings of the Pathological Society, Dublin, 1873-

Allen H.—Elongated kidney with two ureters. Philadelphia Medical Times, 1873-4 iv, 220.

Coeyne.—Anomalie des ureteres, duplicite des deux cotes. Bulletin de la Societe d'Anatomie, Paris (1868), 1874, xliii, 55.

Liouville.—Duplicite des ureteres, diverticulum du peritoine. Bulletin de la Societe d'Anatomie, Paris, (1868), 1874, xliii, 149.

Henriet.—Anomalie des ureteres et des bassinets. Bulletin de la Societe d'Anatomie, Paris, 1874, xlix, 428.

Weigert C.—Ueber einige Bildungsfehler der Ureteren. Archiv f. Pathologische Anatomie, etc. Berlin, 1867, lxx, 490-501, 1 pl.

Mayor.—Absence du rein, de l'uretere, du canal deferent de la vesicule seminale du cote gauche. Bulletin de la Societe d'Anatomie, Paris, 1877, lii, 592.

Josias A. Uremie aigue, nephrite, intersitielle absence congenitale du rein et de l'uretere du cote droit. Bulletin de la Societe d'Anatomie, Paris, 1877, lii, 323-325.

Porter F. T.—Deformity of ureter. Proceedings of the Pathological Society, Dublin, 1877-80, NS. viii, 39.

Baker, W. H.—Malposition of the ureters. New York Medical Journal, 1878, xxvii, 575-589.

Josias, A.—Pneumonie double, absence congenittale du rein et de l'uretere du cote droit. Bulletin de la Societe d'Anatomie, Paris, 1879, liv, 763.

Davies-Colley.—Specimen of malformation and disease of the ureter and bladder in a female child, eighteen months old. Lancet, London, 1879, i, 372.

Josso.—Anomalies de l'uretere. Bulletin de la Societe d'Anatomie, Paris, 1879, Nantes (1876-8), ·, 73.

Josso.—Uretere double. Bulletin de la Societe d'Anatomie de Nantes, 1876-8, Paris. 1879, i, 21.

Wilcox, D. M.—A remarkable instance of periodic obstruction of a ureter in a solitary kidney. Medical Record, New York, 1880, xvii, 502-504.

Fere C.—Rein a double bassinet avec un seul uretere. Bulletin de la Societe d'Anatomie, Paris, 1881, lvi, 417.

Smith T. C.—A case of Brights disease and urinary calculi with anomalous course of the right ureter and of the entrance of the urethra. Detroit, Lancet, 1882-3 vi, 257-260.

Louge P. Un cas d'anomalie ureterale. Marseille Medicale, 1883, xx, 577-580.

Gangolphe.—Calcul renal enchatonne, anomalies de l'uretere gauche et de l'appendice, ileocecal arthrite deformante du coude et du poignet droite, pieds bots congenitaux. Lyon Medical, 1883, xlii, 282-285.

McDowell T. W. Abnormal course of the left

ureter. British Medical Journal, London, 1883, i, 454.

Soller J.—Incontinence d'urine due a une anomalie des organes genito-urinaries; l'uretere droit, ou une bifurcation de celui-ci, vient s'ouvrir isolement a droit et audessous du meate urinaire. Memories et Comptes Rendus, Societe des Sciences Medicales de Lyon (1882), 1883, xxii, 103.

Josso.—Anomalie non decrite de l'uretere. Gazette Medicale de Nantes, 1883-4, ii, 123.

Richmond W. S.—Abnormal ureters. Journal of Anatomy and Physiology, London, 1884-5, xix, 120.

Davies G. S.—Enteric fever associated with recent syphilis, death, absence of left kidney and ureter. British Medical Journal, London, 1885, ii, 397.

Fox W. P.—Meningocerebritis, necropsy, absence of the left kidney and ureter, remarks. Lancet London, 1885, ii, 66.

Davis S. A.—A case of anomalous ureter. Archives of Pediatrics, 1885, ii, 49.

Fenwick E. H.—Atresia of vesical orifice of left ureter (Congenital). Transactions of the pathological Society of London, 1885-6, xxxvii, 300.

Wood, J.—Abnormal ureters from a girl aet. 10 Transactions of the Pathological Society of London. 1885-6, vii, 261.

Double ureter of right side (autopsy), Report of the Supervising Surgeon-General, Marine Hospital Service, Washington, 1885-6, 234.

Davis. S. A.—Two cases of anomalous ureters Archives of Pediatrics, 1886, iii, 421-423.

Weigert C.—Zwei Faelle von Missbildung eines Ureter und einer Samenblase mit Bemerkungen ueber einfache Nabelarterien. Archiv. f. pathologische Anatomie etc., Berlin, 1886, civ, 10-20.

Carrieu & de Rouville.—Rein unique, deux ureteres, dont une anomalie dans les arteres et les veines renales. Bulletin de la Societe d'Anatomie, Paris, 1887, lxxii, 783-791.

Moore N.—Case of congenital narrowing of both ureters with dilatation of the kidneys and perinephric inflammation due to injury in a patient aged twenty years. Lancet, London, 1888 i, 472.

Jackson A. M.—Cystic degeneration of kidneys with two ureters on right side. Transactions of the Pathological Society of London, 1888-9, xl, 160.

Secheyron L.—Des abouchement anormaux de

l'uretere dans le vagin et la vulve. Archives de Tocologie, Paris, 1889, xvi, 254; 335.

Bidwell L. A.—Double ureter. Transactions of the Pathological Society of London, 1889-90, xli, 171.

Davenport F. H.—A case of in continence of urine due to malposition of the ureter. Transactions of the American Gynaecological Society, Philadelphia, 1890, xv, 343-348.

Poulalion A. M.—Fusion congenitale des deux reins, masse renal unique situee verticalement dans la region lombaire droite, existence sur le meme organe de deux bassinets et de deux ureteres, trois groupes vasculaires arteriels et veineux. Bulletin de la Societe d'Anatomie, Paris, 1890, lxv, 397-399.

Chambers G. H.—Anomalous ureter. Transactions of the Pathological Society, Philadelphia (1887-9), 1891, xiv, 199.

Westmacott F. H.—Kidney with double, pelvis and ureter, cord specimen illustrations. Transactions of the Pathological Society, Manchester, 1891-2, i, 115.

Auscher E.—Absence congenitals du rein droit, malformation de l'uretere correspondent. Bulletin de la Societe d'Anatomie, Paris, 1892, 321-323.

Noel J.—Absence congenitale du rein et de l'uretere du cote droit chez une femme de 62 ans. Bulletin de la Societe d'Anatomie, Paris, 1892, lxvii, 360.

Orthmann E. G.—Zur Kasuistik der ueberzahligen Harnleiter. Centralblatt f. Gynaekologie, Leipzig, 1893, xvii, 136-139.

Adami J. G. & Day J. L.—Two cases of complete double ureter. Montreal Medical Journal, 1893-4, xxii, 736-738.

Schwartz, C.—Ueber abnorme Ausmundungen der Ureteren und deren chirurgische Behandlung (nebst Bemerkungen ueber die doppelte Harnblase), Beitrage z. klinischen Chirurgie, Tubingen, 1895, xv, 159-244, 4 plates.

Lindermann W.—Divertikel am Ureter bei Atresie des Letzteren. Centralblatt f. allgemeine Pathologie u. pathologische Anatomie, Jena, 1895, vi, 801.

Spaletta L.—Deux cas de duplicite incomplete de l'uretere. Bulletin de la Societe d' Anatomie 1895, lxx, 616-620.

Colizi F.—Contributo allo studio delle anomalie d

sbococco degli ureteri e all'innesto degli ureteri in vessica. Sperimentale, Sezione Biologie, Firenze, 1895, xlix, 37-61, 1 pl.

Soulie A.—Sur un cas d'uretere double a gauche observe chez un foetus humain du troisieme mois. Comptes Rendus de la Societe de Biologie, Paris, 1895, 10, S. ii, 422.

Auscher.—Anomalie de l'uretere. Bulletin de la Societe d'Anatomie, Paris, 1895, lxx, 748.

Ramsey, O.—A complete duplication of the left ureter from the kidney to the bladder. Johns Hopkins Hospital Bulletin, Baltimore, 1896, vii, 201, 1 pl.

Blumer G.—Notes on two cases of ureteral abnormality. Johns Hopkins Hospital Bulletin, Baltimore, 1896, vii, 174-176, 2 plates.

Obici A.—Le Anomalie di sbococco degli ureteri. Bolletino della Societa a di Medicina di Bologna, 1896, 7th s, vii, 405-446, 1 plate.

Mesley R. et V. Veau.—Double uretere prostatique (2 note), abouchement borgue. Bulletin de la Societe d'Anatomie, Paris, 1896, lxxi, 674-677.

Mesiay R .et V. Veau.—Double uretere prostatique, hydronephrose coincident avec deux uretatique (2 note), abouchement borgne. Bulletin de Maladies des Organes Genito-Urinaries, Paris, 1896, xiv, 747-761.

Musy A. J.—Anomalies des veines renales et des ureteres. Marseille Medicale, 1893, xxx, 106-117.

Brinon H.—Des hydronephroses congenitales et des dilatations congenitales de l'uretere, Paris, 1896.

Jolly J.—Anomalies renales, rein unique, duplicite bilaterale des ureteres, arteres renales multiples en fer a cheval a trois hiles. Bulletin de la Societe d'Anatomie, Paris, 1896, lxxi, 9-11.

Sankott A.—Ein Fall von Agenesis der linken Niere mit Dystopie des Nierenrudimentes und Communication des cystenartig endigenden Ureters mit der Samenblase. Deutsches Archiv f. klinische Medicin, Leipzig, 1896-7, liii, 463-474.

Pyotroff N. V.—On doubling of the ureters leading to hydronephrosis of the kidneys. Bolnitsch Gazette Botkina, St. Petersburg, 1897, vii, 665-671.

Botescu H.—Anomalie renala congenitala un singur rinichiu drept cu 2 uretere deschise normal la fundal besicei dispositiune particulara a vaselor sanguine. Spitalul, Bucuresci, 1897, xvii, 608.

Grenet A.—Deux observations de rein unique

avec absence de l'uretere correspondant au rein manquant. Bulletin de la Societe d'Anatomie, Paris, 1897, lxxii, 941.

Fullerton, Anna M.—Duplication of right ureter. American Gynaecological and Obstetrical Journal, New York, 1897, xi, 656-658.

Albarran.—Uretere surnumeraire ouvert dans la vulve et dans le vagin. Gazette des Hopitaux, Paris, 1897, lxx 743.

Lenander K. G.—Pyonephrosis extirpated from right kidney with two pelves and two ureters. Hygeia, Stockholm, 1899 lxi, 417-494, 1 pl.

Monteverdi I.—Rene unico con duplicita limitata degli ureteri. Gazette degli Ospedali, Milano, 1899, xx, 415-453.

Jacobs C.—Anomalie de la situation anatomique de l'uretere, section au cours d'une hysterectomie abdominal; suture, deces tardif. Bulletin de la Societe Belges de Gynecologie et d'obstetrique, Bruxelles, 1899-1900, x, 239- 241.

Secqueppe E.—Uretere double et uretere bifide chez l'homme, etude embryogenique. Journal de l'Anatomie et de la Physiologie, Paris, 1900, xxxvi, 103-121, 4 figures.

Laurens P.—Duplicite incomplete bilaterale des ureteres. Echo Medical, Toulouse, 1901, xv, 109.

Summers J. E. Jr.—Double ureter, report of a nephrectolmy done upona young child with this condition present. Medical Herald, St. Joseph, 1901, xx, 1-4.

Miller I.—An anatomical deviation of the kidney and ureter. Hahnemanman Monthly, Philadelphia 1901, xxxvi 566-570.

Laurens, M. P.—Duplicite incomplete bilaterale des ureteres Toulouse Medical, 1901, iii, 39-40.

Theuveny L.—Reins polykystiques, absence de l'uretere droit. anomalies concomitantes. Bulletin de la Societe d'Obstetrique, Paris, 1902, v, 251.

Janeway E. G.—Complete double ureter on each side pervious throughout. Proceedings of the New York Pathological Society, 1902, N. S. ii, 39.

Robinson B.—The distal arterioureteral crossing. Medical Herald, St. Joseph, 1902, xxi, 129-137, 3 pl., fig.

Mariotti G.—Ernia dello sinistro nel canale crurale Policlinico, Roma, 1902-3, ix, sez. prat., 503.

Bonnet.—Obliteration De l'uretere par une valvule congenitale forme de diaphragme, resection,

guerison (Rap. de Bazy). Bulletin et Memoires de la Societe de Chirurgie, Paris, 1903, xxxix, 32-42.

Echeverria J. F.—Caso raro di Anomalia. Semana Medical Buenos Aires, 1903, x 1113.

Robinson B.—Remarks on ureteral Anomalies. Texas Medical News, Austin, 1903-4, xiii, 372-376.

Hamburger Y. E.—Bilateral reduplication of the ureters. Protok, zasaid Kavkazsk med. Obsh. Tiflis, 1903-4, xl, 266.

Harbison G. C. R.—Case of double ureter. British Medical Journal London, 1904, i, 488.

Robinson B.—Multiple ureters. Milwaukee Medical Journal, 1904, xii, 33-36.

Robinson B.—The distal termination of complete duplicate ureters. Medical Fortnightly, St. Louis, 1904, xxv, 145-149.

Decherd H. B.—A case of complete bilateral duplication of the ureters. American Journal of the Medical Sciences, Philadelphia and New York, 1904, N. S. cxxvii, 104-106.

Levison L. A.—Bilateral Duplication of the ureters. Journal of the American Medical Association, 1904, xlii, 1354.

Robinson B.—Complete and partial uretheral duplicity. Pediatrics, New York, 1904, xvi, 615-618.

Martinotti M.—Un caso di uretero didelfo. Gior. di ginec. e di pediat, Torino, 1905, v. 185-188.

Beck C.—Introalla tecnica della dislocazione ureterale nella ipospadia ed in altri diffetti e lesioni dell uretra, Policlinico, Roma, 1905, xii, sez. chir., 93-98.

Albarran.—Annales de la Societe Medical Chir. de Liege, 1905 xliv, 328.

Cristalli G.—Un caso di duplicita competa dell uretere Medicine Italia 1905 iii 181-183.

Vincent & Bermas—Coni anomalie ureterale Bulletin Medical de 1 (Algere, Alger 1906 xvii 396.

Steele D. A. K. Single kidney with two ureters Annals Surgery Phila, 1906., xliii 953-957.

Viannay C. Cotte G.—Absence congenitale du reins de l'uretere et des voies spermatiques du cote droit. Bibliographie Anatomie Paris & Nancy, 1906 xv 20-23.

CHAPTER III.

PHYSIOLOGY.

1830-1905.

Physiology of the ureters has been thoroughly considered both experimentally and surgically.

Its purpose is purely mechanical, in that it serves to carry the renal secretion to the bladder and to prevent its return from the bladder.

Blandin, in 1830, was among the first to call attention to the ureters as canals of this character.

Donders, in 1852, called attention to its peristaltic motion, and Vulpian, in 1858, to its contractility.

James, in 1878, mentioned physics as applied to both the bladder and ureters, and Fenwick, in 1886, spoke of the suction of the ureters.

BIBLIOGRAPHY.

Blandin, J. B.—Journ. hebd. de méd., Paris: 1830, vii, 271-274.

Donders—Nederland Lancet Gravenhage: 1852-3, 3rd series, 266-270.

Vulpian—Comptes rendus de la Société de Biologie, 1858. Paris: 1859, 2nd. s. v., 30-33.

Englemann, T. W.—Arch. f. d. gesammte Physiologie, Bonn: 1869, ii, 243-293.

Reliquet.—Cases Illustrating the Action of Continuous Electric Currents on Spasms of the Bladder, Urethra, and Ureters. The Practitioner. London: 1872, ix, 98-103.

James, A.—Edinburgh Medical Journal, 1878, xxiv, 293: 406.
Luchsinger, B.—Mittheilung. d. Naturforscher Gesellschaft in Bern, 1881, 98-100.
Sololoff O. and Luchsinger B.—Archive f. d. gesammte Physiologie. Bonn: 1881, xxvi, 464-469.
Fenwick, E. H.—Lancet. London: 1886, i, 529.
Smith, J. G.—Journal of Anatomy and Physiology, London, 1887-8, xxii, 496.
Fenwick, E. H.—Journal of Cutaneous and Genitourinary Diseases, New York: 1889, vii, 101-103.
Stern, Lina.—Contribution á l'étude physiologique des contractions de l'uretere. Genéve: 1903, p. 85.
Robinson, B.—Ureteral function. American Medical Compend. Toledo: 1904, xx, 255-266.
Robinson, B.—Functional and Age Relations of the Ureter. St. Paul Medical Journal. St. Paul, Minn.: 1904, vi 47-51.

CHAPTER IV.

EXPERIMENTAL.

1818-1905.

Experiments upon the ureter have concerned its pathology, biology, physiology, anatomy, and surgical possibilities. This work has been based upon both animal and man, and has aided materially in the advancement of surgical technique, which has accomplished so much in matters pertaining to the ureter.

Strauss and Germont, in 1882, reported on histological lesions of the kidney of the guinea pig in a series of ligatures on the ureter. Zamshin, in 1887, made researches on the functions of the ureters in a woman with rectovaginal fistula. Poirier, in 1891, reported on some phenomena of the ureteral injections. Reed, in 1892, successfully implanted the ureters of a rooster into its rectum, while Ricketts, in 1899, and Frank, in 1901, were equally successful in implanting the ureters of dogs into the alimentary tract at various points to determine the possibilities and comparative percentage of renal infection. They found that renal infection was less likely to occur as the implantation was made nearer the sphincter ani.

Crile, in 1905, has succeeded in transplanting the kidney of a dog into the neck by anastomosing the renal artery and vein with the thyroid artery and vein, and inserting the ure-

ter into the oesophagus. The kidney continued to live and functionate indefinitely, while the urine escaped into the alimentary tract.

BIBLIOGRAPHY.

Straus, I., and Ermont, U.—Des lésions histologiques du rein chez le cobaye a la suit de la ligature de l'uretere. Archiv. de Physiologie norm. et Pathologique. Paris: 1882, 2s, ix, 386-411, 1 pl.

Zamshin, A. I.—Researches on the Function of the Ureters in a Woman with Rectovaginal Fistula. Ejened klin. Gazette. St. Petersburgh: 1887, vii, 13-19.

Poirier, P.—Sur quelques phonomenes consecutifs aux injections ureterales. Comptes Rendus de la Société de Biologie. Paris: 1891, 9th s, iii, 585-587.

Reed, R. H.—Ann. of Surg. Phila: 1892, xvi, 193-210, 4 pl.

Browne, B. B.—Artificial Vesicovaginal Fistula for the Examination and Treatment of Ureteral Diseases. Maryland Med. Jour. Baltimore: 1893-4, xxx, 114-116.

Tuffier.—Hydronéphrose par conduire de l'uretere (experimentation). Bulletin de la Société d'anatomie. Paris: 1893, lxviii, 435.

Van Hook, W.—Experimental Union of the Ureter after Transverse Division. Jour. Amer. Med. Assoc. Chicago: 1893, xx, 225.

Neumann, S.—Observations on the Functions of Both Kidneys in Cases of Fistulae of the Vessels of the Ureters and the Abdominal Wall. Magyzine orv. Archiv. Budapest: 1894, iii, 135-178.

Cassiti E., et A. Boari.—Contributo sperimentale alla plastica dell uretere. Atti Accad d. Scienze mediche et nat. in Ferrara, 1894, lxviii, 149-154.

Beck, A., and Gluzinske, W. A.—Influence of Tying the Ureter upon the Function of the Kidney; a Contribution to the Theory of Urine Secretion. Rozpr. Akademie Umiej Wydz Matemat—Przyr. Krakow: 1895, 2nd s., ix, 308-329.

Monari, U.—Ueber uretero Anastomosen. Experimentelle Untersuchungen. Beitrage zur klin. Chir. Tuebingen: 1895-6, xv, 720-734.

Likhautscheff, A.—Experimentell Untersuchun-

gen ueber die Folgen der Ureterunterbindung der nachfolgenden Urat-ablagerungen. Beitrage zur pathologischen Anatomie u. z. allgemeinen Pathologie. Jena: 1896, xx, 102-154, 1 pl.

Boari, A.—Maniere facile et rapide d'aboucher les ureteres sur l'intestin sans sutures a l'étude d'un bouton spécial; récherches experimentelles. Ann. des maladies des organes génitourin. Paris: 1896, xiv, 1-25; also English translation, Columbus Med. Journ., 1897, xix, 1-20.

Bovee, J. W.—A Contribution to the Experimental Surgery of the Ureter. Ann. of Surg. Phila., 1897, xxvi, 314-319: also Trans. Amer. Gynaec. Soc. Phila. 1897, xxii, 283-289.

Protopopow, S. A.—Beitrage zur Anastomie der Ureteren (anatomische-experimentelle Untersuchung). Archiv. f. d. gesammte Physiologie. Bonn: 1897, lxvi, 1-113, 1 pl. 2 diag.

Mikhailoff. M. P.—On Cardiac Hypertrophies, Alterations in the Muscle, Vessels, and automatic ganglia, of the heart, when the Activity of the Kidneys is Destroyed by Tying One Ureter or One Renal Artery; Experimental and Histological Research. Bolnitsch. Botkina, St. Petersburgh: 1899, x, 623-640, 2 pl.

Urso G. Fabii A.—Récherches expérimentales sur l'uretero-eteroplastique. Ann. des Maladies des Org. Génito-Urin. Paris: 1900, xviii, 1145-1178, 13 figures.

Bertenson, B. L.—Pathoanatomy of Experimental Hydronephrosis, Changes in the Kidney with Untouched Ureter; in the Liver and Brain when One Ureter is Tied; experimental and Histological Research. Gazette Botkina, St. Petersburgh: 1900, xi, 1183-1236.

Boari, A.—Chirurgia delle uretere; studio sperimentale e clinico anatomia chirurgica corso di operazioni caterismo ureterale nella donna e nell-'uomo; 126 figure nel testo e 147 osservazioni con prefazione. Roma: D. Alighieri, 1900, 444 p. 126 Fig.

Kibbe, M. E.—Results of Ligation of One Ureter. Occidental Med. Times. San Francisco: 1901, xv, 46-49.

Gilbert and Herscher. Surcoloration du sérum dans la néphrite interstitiell et dans ligature expérimentale des ureteres cholémie et ictere d'origine

renale. Comptes Rend. de la Soc. de Biologie, Paris, 1902, 11 series iv, 386-388.

Kosminski, F.—On Ligating the Ureters. Ginekologia. Warszawa: 1903-4, i, 607-648.

Zaloga, A. G.—Observation on a Patient with a Ligated Ureter. Russk. Khirurgie Obozr. Moskow: 1903, i, 140-143.

Bernasconi, F. and Colombino S.—Bulletin et Memoire Sociétie Anatomie de Paris 1905, lxxx 630-633.

Jungano M.—L'uretero-cistoneostomie (risultati clinici e sperimentali lontani modificazioni al commune processo operatorio) Medical itali Napoli, 1906, lv, 5 401-424.

Fiori, P.—Patologia sperimentale del rene legature dell l'uretere e suoi esiti. Clin. Chir. Milano, 1904, xxi, 762; 915.

Amos, Miss B. S.,—On the effect of ligature of one ureter. Journal Pathology and Bacteriology, Edinburgh and London, 1904-5, x, 265-286, 1 pl.

Cubbins, W. R.—Wounds in the ureter, an experimental study. Surgery Gynecology and Obstetrics. Chicago, 1906, ii, 617-628.

CHAPTER V (a).

URETERECTOMY.

1847-1906.

1. Ureterectomy.
2. Uretero-Lithotomy.
3. Ureterorraphy.
4. Uretero-Ureteral Anastomosis
5. Uretero-Colon Anastomosis.
6. Uretero-Vesical Anastomosis.
7. Miscellaneous.

Urecterectomy.—Removal of the ureter in part, or in its entirety, is most desirable in malignancy and tuberculosis; it is occasionally resorted to in nephrectomy for tuberculosis associated with tuberculosis of the ureter. Also for fistula resulting from disease, rupture, or otherwise. The distal end should always be ligated, silk being the most desirable material for this purpose.

Dr. Elliot, in 1887, reported a case of nephroureterectomy; retroperitoneal extirpation of a kidney with its ureter; specimen showed a ureteropyelonephritis. In speaking of the amount of urea daily excreted he says that it is interesting to note that the average daily amount excreted in the first five days of the second week after the operation was 340 grains. Thus, at the beginning of the second week after the operation, which was severe and followed by a critical illness, we find the remaining kidney secreting as much urea as both were doing

when in comparatively good health just before the operation. Moreover, the average amount of urea for five days, five weeks after the operation, was 405 grains, an amount greatly exceeding anything that both kidneys had ever done while under observation. These facts suggest caution in accepting the dictum of the so-called "conservative renal surgery," that any part even of a diseased kidney should be left if possible. The only cases of nephro-ureterectomy I have been able to find in the literature are reported by Kelly in the *Johns Hopkins Hospital Bulletin* for February and March, 1896. Kelly reports three cases of his own, and refers to another. They were all done in different ways, and were all successful. The first case was done by a laparotomy, transperitoneal. The second case was a retroperitoneal operation by a long lumbar incision like the one here reported. The third case was also retroperitoneal, by a short lumbar incision and a vaginal incision through which the lower end of the ureter was removed. The case referred to was reported by Dr. Reynier, February 24, 1893, in *la Semaine medicale*. The patient, a man 20 years old, had his kidney removed on April 7, 1892, for ureteropyelonephritis; at a later day, five inches of the ureter were removed by enlarging the lumbar incision; the patient not being cured, an effort was made, but without success, to reach the lower end by a pararectal incision. Later, the lower portion was removed by an incision parallel to the inguinal canal; result good. Bovee, in 1900, on ureterectomy, says surgery of the kid-

ney is practically of recent date, although during the sixteenth, seventeenth and eighteenth centuries, the practicability of nephrectomy had been discussed, and Zambeccarius, in 1670, and Roonhuysen, in 1672, had proved by experiments on animals that one kidney could do the work of both. It may be fairly stated that Simon's successful nephrectomy, in 1869, though done in an emergency and for an indication not now recognized, marks the beginning of the surgical treatment of this very important organ. Surgery of the ureter was the logical sequence to renal surgery. Yet, strangely enough, Gigon had thirteen years previously published a case of calculous anuria, recommending and carefully describing the technique of ureterectomy—called by him "ureterotemnie," and practically followed years later by LeDentu and Pozzi.

The interest in this subject has not lagged, and at the present time nephrectomy for injuries and diseases of the ureter is called for extremely rarely.

Now calculi are removed from ureters by incision; injuries to it closed by suture or drainage; strictures relieved by delicate plastic operations, curing many cases of hydronephrosis in this way; resections for complete section of it, either accidental or intentional, are easily and safely done, about twenty cases bearing evidence of this; and even its entire removal has been practised nine times with very gratifying results. It is furnishing the surgical world today with the richest field for excellent surgery. By the term ureterectomy is understoo

the partial or complete removal of the ureter. If removed with the kidney, it is primary, and if at a time subsequent to nephrectomy, it is secondary urecterectomy. The partial removal is often done with nephrectomy, part of the pedicle being formed from the upper end of the ureter, but this paper does not refer to such cases. Total removal was first done by Poncet, in 1893, and the first partial operation by Tuffier, in 1891. Since then the total operation has been done by McCosh (2 cases), Kelly (2 cases), Gerster, Hartmann, Morris, and myself,—in all, 9 cases. The partial operation has since been done by Reynier, Kelly, Postnikow, Schiller, Morris (2 cases), Elliot, Pouisson, Abbe, and Sommers;—in all 11 times. The complete operation was primary in four cases, Kelly two cases, and McCosh and Morris each one. Partial primary ureterectomy was done 8 times by Tuffier, Kelly, Postnikow, Schiller, Elliot, Morris, Abbe, and Sommers. But one of these 12 cases of nephroureterectomy was fatal (Morris's partial). Mine, a total secondary operation, death also occurred, giving the 20 operations a mortality of 20 per cent. In my case, that of a man at forty-eight years, the upper end of the ureter was surrounded by calculi and thickened pus, it was one inch in diameter, and filled with cheesy pus and calculi, the incision was extended to the inguinal canal and removed, in pieces, the whole of the duct, its distended lumen ended abruptly about ½ an inch from the bladder, the remainder being a solid cord. Death in seventeen hours. Diagnosis "Caseous tuber-

culosis of the ureter." *N. Y. Med. Jour.*, lxxix, 1904.

Witherspoon writes on an operation to reach the lower ureter by an extraperitoneal route, and states the advantages as follows:

1. "It is extraperitoneal and avoids the danger of peritoneal infection."

2. The opening is directly over the route of the ureter and allows a good view of that structure through a very small cut in the abdominal wall.

3. It allows of a thorough palpation through the peritonaeum, of both kidneys and ureters, and at the same time, of an exposure of the ureter on the side of the incison for extraperitoneal operation upon its lower end. Many times a decided doubt exists as to the full extent of the trouble, and in these cases a thorough palpation of the entire urinary tract may be of value.

4. The field of operation is bloodless and no forceps is in the way.

5. Drainage is usually necessary after opening the ureter, which may be carried through the lower end of the rectus and does not leave the bright prospect of hernia, which a para-Poupart incison does.

6. The dissection is not difficult and can be carried out by any reasonably prepared surgeon, as it does not require the skill of a specialist.

The routes which have been proposed to the present time for the operation upon the lower ureter are:

1. The intravesical (suprapubic, perineal, and transurethral).

2. Intrarectal, or transrectal, used by Cesi, in 1889. Patient died thirty-six hours later.

3. Iliac, or para-Poupart, incision.

4. Sacral route, proposed by Cabot in 1892, and worked out on cadaver.

5. Pararectal route, used by Morris in two cases. Incison from a point opposite the third sacral spinous process to a point one inch and a half beyond the tip of coccyx.

6. Perineal route, proposed by Fenwick in 1898. Used where the stone could be felt through the rectum.

7. Transperitoneal route. This is too dangerous a route to be attempted.

BIBLIOGRAPHY.

Roberts.—De l' introduction accidentelle de corps etrangers dans la vessie; observation d'un cure-oreille ainsi introduit par l' uretere: tentative d'extration: resultat funeste. Union médicale, Paris: 1847, i, 510.

Zweifel, P.—Archiv. f. Gynaekol. Berlin: 1879-80, xv, 1-36.

Le Fort, L.—Bull. del Acad. de Méd. Paris: 1880 2nd s., x, 1185-1196.

Gluck, T. & Zeller.—Berliner klin. Woch., 1881, xviii, 648.

Sonnenberg, E.—Berl. klin. Woch., 1882, xix, 356.

Boeckel, J.—Gas. méd. de Strasbourg, 1884, 4th s. xiii, 105-108.

Kuster.—Verhandlung d. Deutsch. Gesellsch. f. Chir. Berlin: 1892, xxi, pt. ii, 228-232.

Kelly, H. A.—Johns Hopkins Hosp. Bull. Baltimore: 1896, vii, 31-37. 3 plates.

Elliot, J. W.—Boston Med. & Surg. Journ., 1897, cxxxvi, 173-175. Discussion 187-189.

Gerster, A. G.—Ann. of Surg., Phila. 1897, xxvi, 361-365.

Hartman, H.—Assoc. Franc d'Urlogie, proc-verb. 1897, Paris, 1898, ii, 162-165.
Meyer, W.—Med. News. New York: 1900, lxvii, 448-454.
Lennander, K. G.—Ueber Spaltung der Nieren mit Resektion des Nierengewebes bei akuter Pyelonephritis mit miliaren Abscessen, in einem der Falle auch Uretero-cysto-neostomïe. Nord. Med. Ark. Stockholm: 1902, Afd. i (Kirurgi), No. 1, 1-46.
Lund, H.—Lancet. London: 1902, ii, 1624-1626.
Bovee, J. W.—New York Med. Journ., 1902, lxxv, 81-85; 142-146.
Onufrovich, O. B.—Prak. Vrach St. Petersburg: 1903, ii, 515; 536.
Liaudet, Jean.—Paris: 1894, 174, p. 2 plates.
Bovee, J. W. Ann. Gynaec. & Paed. Boston: 1900 xiii 265-269.
Jaboulay. Lyon Medical; 1903, C. 755.
Stefanesco, Galatz.—Bull. et mém. de la Société de Chirurg. de Bucarest, 1903-4, vi, 57-59.
Guinard.—Bull. et mém. de la Société de Chir. de Paris, 1904, n. s. xxx, 739-743.
Raffin.—Lyon med., 1905, cv, 19-23.
Deryuzhinski, S. F.—Khirurgia Moskow, 1905, xvii, 358-362.
Le Clerc-Dandoy.—Journal Medecine de Bruxelles 1905 x 170.
Schwyzer, A.—St. Paul Medical Journal Minn., 1905 vii, 1-11, 1 pl.
Smith, L.—Montreal Medical Journal, 1905, xxxiv, 229-231.
Paunz, S.—Urologia Budapest, 1906, 47-50.
Purcell, F. A.—Medical Press and Circular, London, 1905 ns. lxxx, 672.
Paunz, S.—Orvosi Hetil Budapest, 1906 i 446.

(CHAPTER V. (b).

URETEROLITHOTOMY.

1800-1905.

Ureterolithotomy—removal of concretions from within the ureteral canal—has been an established procedure for more than a century, Thomas being one of the first to do it. Concretions may be removed from any point in the ureteral tract in this way.

Extraction of ureteral concretions may also be made with forceps, intravesical through the bladder into the ureter. This is the most recent method and has been employed by Lewis, Young, Otis, and others, to whom great credit should be given for so high a degree of excellency in this field of surgery.

Concretions may be removed from the upper half of the ureter with forceps, introduced into the ureter from above, after the kidney or ureter has been opened.

Cullingworth, in 1884, reported a case of impaction of a large calculus in each ureter immediately above the vesical orifice, causing dilatation of the ureters and abscesses in the kidneys, the kidney on the right side forming a large abdominal tumor. Abdominal section with a view to nephrectomy; removal of calculus from right ureter; death (from uraimia). At autopsy, the right kidney and ureter though still large, were no longer sufficientiy distended to form a noticeable tumor, the kid-

ney measured 5½ by 2½ inches. It contained numerous abscesses and two small calculi; the diameter of the ureter close to the kidney was 2 inches and its narrowest part an inch. The sutures in the ureter had not given way, and there was no evidence of leakage. Left kidney enlarged 6¾ by 2½ inches its pelvis and calces forming a large and irregular abscess cavity. The left ureter was greatly dilated, and, at its lower end, half an inch from the entrance to the bladder, was a calculus, similar in shape to the one removed from the right ureter, and somewhat longer, its length being 3 inches. Morris, in 1884, reported on a calculus impacted in the ureter, and the feasibility of removing it by surgical operation. He says that in the whole number of 34 volumes of the *Transactions of the Pathological Society of London,* there are only eight cases recorded of impacted ureteral calculus, Morris reports a case of calculus at the lower end of the ureter. Dr. Rawdon reported a case in which a calculus impacted in the lower end of the ureter was detected with finger in the rectum during life; and its presence there was verified after death. *Brit. Med. Journ.,* February 1, 1879. Sir Spencer Wells has reported a case of urinary calculus which was discharged per rectum: He conjectured that "perhaps the calculus had never been in the bladder, but had passed from the ureter downwards behind the bladder." (*Trans. Path. Soc. London,* Vol. v. p. 202.)

In conclusion, Dr. Morris says that the cases in which an exploration of the bladder

should be made with the view of performing the operation on the ureter are:

1. In hydronephrotic or pyonephrotic enlargement of the kidney associated with bladder symptoms, with the hope of reestablishing the natural drainage through the ureter.

2. Before nephrectomy is resorted to for hydronephrosis or pyonephrotic tumors, which have been opened or tapped through loin without benefit.

3. Before nephrectomy is resorted to in cases of suspected renal calculus, in which no renal tumor exists, and where, after digital exploration and puncture of the kidney through the loin, no stone is found.

4. In cases of sudden or rapid suppression of urine, or anuria occurring after symptoms which have given rise to suspicion of stone in one or other or both kidneys. A kidney which has undergone compensatory hypertrophy may become blocked by a calculus which has been forced by the superimposed urine to the lower end of the ureter and which cannot pass the vesical orifice of the ureter. Such a kidney may be, probably is, the only one the patient has to depend on; and in this case, death must ensue if the obstruction is not removed. If no stone can be felt through the bladder, life may yet be saved by giving a vent to the pent-up urine by lumbar nephrotomy.

Goodlee &Ralfe, in 1888, reported a case of suppression of urine caused by impaction of calculi in both ureters relieved by operation; Ricketts and Ricketts, in 1889, made an abdominal section for rupture of left ureter re-

sulting from two large calculi; death. Cabot, in 1890, reported a successful case of ureterolithomy in a woman with stone lodged in the middle portion of the ureter and weighing 190 grains. Fenger, in 1894 on the operation for the relief of valve-formation and stricture of the ureter in hydronephrosis or pyonephrosis concludes as follows:

1. Exploration of the ureter as to its permeability should be done from the renal wound by a long flexible silver probe (a uterine probe) of an elastic bougie, either olive-pointed or not. If the bougie passes into the bladder, the examination is at an end. The size of bougie, that will pass through a healthy ureter is from 9 to 12, French scale.

2. If the pelvic orifice of the ureter can not be found from the renal wound, it should be sought for by opening the pelvis, pyelotomy, or by incising the ureter, ureterotomy.

3. A longitudinal incision, half an inch to an inch long, in the posterior wall of the pelvis can be made while the kidney is lifted upward against the twelfth rib. This procedure is easy if the pelvis is dilated, but may be impossible if the pelvis is of normal size.

4. A stricture in the ureter, if not too extensive, can be treated by a plastic operation like the Heinecke-Mikulicz operation for stenosis of the pylorus; namely, longitudinal division of the stricture and transverse union of the longitudinal wound. This method of operating for ureteral stricture seems to me preferable to resection of the strictured part of the ureters (Kuester's operation) for the

lowing reasons: It is more economical operation and preferable when the elongation of the ureter is not sufficient to permit the two cut ends of the ureter, after excision of the stricture, not only to come in contact, but even to permit of closure and invagination without stretching.

5. Resection of the upper end of the ureter and implantation of the distal end into the pelvis has been performed in an important and interesting case by Kuester, and the result was brilliant success. His method was to split and unfold the end of the ureter, and to implant it into the opened pelvis to which it was united with sutures.

6. In a similar case of stricture in the end of the ureter, especially if the ureter were not elongated or the kidney movable, I should prefer the plastic operation already described, as it is easier of technique, and as it proved successful in my case of traumatic stricture in the ureter below the pelvic orifice.

7. The ureter is accessible through an extraperitoneal incision, a continuation of the oblique incision for lumbar nephrotomy, from the 12th rib down along, and one inch anterior to the ilium, and along Poupart's ligament to about its middle. This incision gives access to the upper three quarters of the ureter, and down to within an inch and a half or two inches above the bladder.

8. The vesical and lower pelvic portions of the ureter may be reached, as Cabot, of Boston, has pointed out, by means of the sa- operation or Kraske's method modified by

osterplastic temporary resection of the os sacrum. In woman, the vesical portion of the ureter is accessible through the vagina.

9. The vesical orifice of the ureter may be reached from within the bladder by suprapubic cystotomy in man, or by dilatation of urethra, or superpubic or vaginal cystotomy in woman. Wainless, in 1903, reported a case of stone impacted in the ureter, with operation, and recovery.

The case was of special interest, on account of the kinking of the ureter, the impingement of the stone on the renal pelvic brim, the method of removal by incision of the pelvis of the kidney, and transfixion of its posterior wall in order to reach the looped-up ureter, which it seemed impossible to otherwise incise.

Dobson reports a case of ureterolithotomy in a male aged twenty-five years: who had suffered from renal colic for four months, and during the latter attacks, the kidney had become enlarged. Haematuria and pyuria were absent, but the urine contained albumen. On palpating the abdomen, a calculus was felt in the ureter just over the common iliac artery. Retroperitoneal exposure of the ureter was made by an incision internal to the spine of the ilium, and a calculus which was rough, angular and imbedded in the wall of the ureter, was extracted through a longitudinal incision one centimetre in length. The permeability of the ureter was assured by passing a bougie up into the kidney and down into the bladder. No sutures were placed in the ureter, but th wound was drained. The escape of uri

ceased on the fifth day, and the patient made a good recovery.

Schmidt (*Amer. Journ. Obstet.*, xlix, 1904) reports a case of female, age thirty-five years, who had calculus removed from the ureter. She had suffered a sudden typical attack of renal colic and at intervals of about a year, these attacks have been repeated. In all but the first attack, considerable pain followed in the right iliac region. Some four years ago, a surgeon made a ventral fixation to relieve this condition. Skiagraphs taken shortly after this time showed a stone 5/8 inches long and 1/8 inches in diameter in the lower portion of the right ureter. One year ago, the stone was shown in the same position. With the object of removing this body, the right ureter was catheterized. About 7 cm. from the ureteral orifice, a slight obstruction was felt. The catheter was allowed to remain for two hours in order to make examination of the urine from the two kidneys, in case an operation became necessary. At the end of this time, 15 c.c. of abolene were injected into the pelvis of the kidney and 5 c.c. injected as the catheter was being withdrawn. Colicky pains were immediately felt, these continued intermittently for eight days, when the stone was passed from the urethra.

Amer. Journ. Obstet., 1, 1904.

Buvee presented a paper before the Amer. Gyn. Soc. of Boston, on ureterolithomy as follows:

History.—In 1856, Gigon recommended opening the ureter through the loin to remove

ureteral calculi. In 1870 Bryant, at Guy's Hospital, incised and explored the renal pelvis through a loin incison. In 1882, Bardenheurer incised and explored the ureteral pelvis for calculi, and sutured the wound made in it. In 1884, Henry Morris proposed rapid dilation of the female urethra, and urethrotomy just in front of the prostate in the male, and then proceeding transvesically to remove calculi from the very lowest portion of the ureter. At the same time Emmet did vaginal ureterotomy, removing calculi with the curette.

In 1885, Cullingsworth planned and performed uretrolithomy through the lumbar incision. In 1887, Ceci removed a calculus from the lower portion of the ureter by the rectal route. Desault, in 1887, used and recommended his kiotome for incising the ureterovesicular junction in order to facilitate transvesical extraction of calculi from the lower portion of the duct; and in 1888, Richmond, of Missouri, succeeded in removing a stone lodged near the exit of the ureter by means of rapid urethral tenaculum. In 1886, Israel reported removing calculi from the upper part of the duct. Bergmann, Kirkham, R. B. Hall, Twyman and others did this operation previous to 1890.

Size and Number of Calculi.—The sizes of ureteral calculi vary from the merest particle to dimensions of several inches. According to Henry Morris, Le Dran quotes a case in which there were several calculi, weighing together three ounces, impacted in the middle

part of the ureter. In one of my cases the calculus weighed 1,310 grains, and had diameters of 2, 3¼ and 1½ inches respectively. This is larger than any I have found recorded. Sometimes several are present, Morris having removed nine from the lower part of one ureter. In some autopsies both ureters have been found filled by a large number of impacted calculi. To find two or three at different points along the duct is far from uncommon.

Routes.—The routes for reaching and extracting ureteral calculi are the transperitoneal and the extraperitoneal.

The latter may be subdivided into loin, inguinal, vaginal, rectal, sacral, perineal, and transvesical.

For removing the calulus from the ureter the different procedures have been:

1. Pushing the stone in a reverse direction to its passage and extracting it through the wall of the duct at a more favorable point, or through the kidney structure:

2. Dilation of the portion of the duct below the calculus and removing the stone through the bladder.

3. Longitudinal ureterotomy at the point of lodgement of the calculus; and

4. Intraureteral injection of sterilized vaseline as recommended and employed by Schmidt of Chicago. Crawford, (*Amer. Med.*, 1904, viii, p. 971), reports on the operative technic in stone in ureter with one case operative as follows: Free suprapubic opening into the bladder and found this viscus ab-

solutely free of any foreign body. On having an assistant elevate the floor of the bladder through the rectum, found the left ureter very slightly patulous and by insinuating the point of finger through the meatus, discovered a stone of very large size for that location. Meatus not dilated by forcible instrumentation but with the point of the index finger introduced.

Fowler, (*Ann. of Surg.*, xl, 1904, p. 943), reports two cases on the iliac extraperitoneal operation for stone in the lower ureter in the male and concludes as follows:

Extraperitoneal ureterolothotomy is a highly successful operation. The mortality should even be less than that for nephrolithotomy, and with an operation combining such small risk with so great technical simplicity, this part of the urinary apparatus will be as fearlessly and as successfully exposed as the other portions which have long been considered more easily accessible.

The intravesical portion of the ureter is most readily and most satisfactorily reached by suprapubic cystotomy. This gives the best exposure. The operation on the ureter can be carried out under guidance of the eye.

Calculi in the intravesical or intramural portions of the ureter then are best reached by suprapubic intravesical route; calculi impacted in the juxtavesical and paraischial portions should be removed by the iliac extraperitoneal route.

Fowler reports the case of a man on whom Agnew made a lithotomy October 30, 1887,

removing a stone weighing three ounces, and on whom Cantwell made a nephrectomy, September 21, 1897.

About January 10, 1905, the third operation was made in the form of a suprapubic cystotomy for the removal of a ureteral calculus four inches long and about one-half inch in diameter.

This concretion protruded from the ureter into the bladder. The patient left the hospital on February 5, 1905, able to follow his old trade and habits.

BIBLIOGRAPHY.

Thomas.—Aiguille de matelassier, longue de 12 centimetres (4 ounces 10 lignes, environ) avec incrustation calculeuse d'un cent. d'epaisseur (quatre lignes et demi) extraite du canal de l'uretre par une opération apres un sejour de deux ans et demi. Record period. soc. de medecine de Paris, 1800, viii, 216-218.

Boyer, P.—Corps étranger dans la vessie et dans l'uretere du a la rupture d'une sonde et de son mandrin pendant l'operation du cathéterisme extraction. Gaz. des Hosp., Paris: 1856, xxix, 222.

Gigon, C.—Mémoire sur l'ischurie uréterique et sur l'uréterotemnie, ou taillie de l'uretere. Union Méd., Paris 1856 x 81; 85; 93.

Morton, T. G.—Suspected Calculus in Ureter; Direct Examination of the Ureters. Phila. Med. Times, 1873-4, iv, 182.

Munoz.—Escirro de la vejiga urinaria con transmission a dos asas intestinales calculo vesical dilatacion considerable de los calices y pelvis y de los ureteres. Siglo Medico Madrid; 1870, xvii, 41, 55.

Bandl, L.—Zur Entestehung und Behandlung der Harnleiterscheidenfisteln. Wiener med. Woch., 1877, xxvii, 721; 749; 769.

Von Nussbaum, J. N.—Kunstliche Harnwege: 1. Temporare Drainage zur Bildung eines kunstlichen Harnleiters. 2. Temporare Drainage zur Bildung einer kunstlichen Harnrohre. Zwei kleine Mittheilngen. Muenchen: 1883.

Eger.—Zahntagige Anurie nach doppelseitigem Ureterenverschluss durch Steine. Deutsche med. Woch. Berlin: 1884, X, 131-133.

Cullingworth, C. J.—Trans. Path. Soc. of Lond., 1884-5, xxxvi, 278-281.

Morris, H.—Amer. Journ. Med. Sciences, Phila: 1884 lxxxviii, 458-468.

Schultz, D.—Archiv. d'Obstet. et de Gynécol., Paris: 1887, ii, 205-262.

Halle, N.—Gaz. d. Hosp., Paris: 1887, lx, 925-931.

Desnos, E.—Gaz. Med., Paris, 1887, 7th series, lv, 449-461-472-498-512-521.

Marsh, H.—Lancet, London: 1888, i, 369.

Richmond, J. M.—Trans. Med. Assoc. of Missouri, St. Louis: 1888, 314-316.

Perez, F.—Exploration des ureteres. Paris: 1888.

Dunn, S.—Paris: 1889.

Ralfe, C. H., & Goodlee, R. G.—Trans. Clin. Soc. Lond., 1888-9, xxii, 155-162.

Kirkham, F. W.—Lancet, London: 1889, i, 525.

Assmuth, J.—St. Petersburg, med. Woch., 1889, xiv, 269-271.

Plicque.—Progres méd. Paris: 1889, 2nd series, ix, 235.

Hall, R. B.—Trans. Amer. Assoc. Obstet. and Gynaec. Phila: 1890, iii, 168-174.

Lane, W. A.—Lancet, London: 1890, ii, 967.

Kelly, H. A.—Johns Hopkins Hosp. Rep. Baltimore: 1890, ii, 234-242.

Cabot, A. T.—Boston Med. and Surg. Journ., 1890, cxxiii, 613.

Twyman, G. E.—Trans. Clin. Soc., Lond., 1890, xxiii, 93-97.

Le Dentu.—Greffe de l'uretere entre less levres d'une incision du flanc chez une femme atteinte d'anurie absolute. Congres franc. de chirurgie, Proc-Verb., etc., 1889 Paris: 1890, iv, 533.

Willems, C.—Ann. de la Soc. de Méd. de Gand, 1891, lxx, 254-259.

Pozzi, S.—Congres franc. de Chir., Proc-Verb. Paris: 1891, v, 606, 616.

Michailow, M.—St. Petersburg, med. Woch., 1892, ix, 16.

Bazy, P.—Maladies des voies urinaires, uretre, vessie; exploration; traitement d'urgence. Paris: 1892.

Morison, R.—Lancet, London: 1894, ii, 1093.
Cotterell, E.—Medico-Chir. Trans., London: 1894, lxxvii, 255-261.
Kelley.—Johns Hopkins Hosp. Bull. Baltimore: 1894, v, 137.
Helferich.—Archiv. f. klin. Chir. Berlin: 1894, xlviii, 875-878, 1 pl.
Albarren.—Loire médical, St. Etienne: 1894, xiii, 340.
Legneu.—Fereredi médical, Paris: 1894, v, 357-35°.
Morris, H. A.—Lancet, London: 1895, i, 1455.
Robinson, H. B.—Brit. Med. Journ., London: 1897, ii, 648.
Hartmann.—Rev. de Chir. Paris: 1897, xvii, 1046.
Robinson, H. B.—Med. Press and Circ., London: 1898, lxv, 160.
Fenwick, E. H.—Edinburgh Med. Journ., 1898, n. s., iii, 281-285.
Clark, W. B.—Clinical Journal London: 1899-1900, xv, 171-174.
Sommer, G. N. J.—Ann. Surg. Phila: 1900, xxxii, 843-846.
Schnenck, B. R.—Four Cases of Ureterolithotomy. Journ. Amer. Med. Assoc., 1901, xxxvi, 1300-1304.
Ricketts, B. M.—1901. Opened right kidney posteriorly for stone, sounded ureter with negative results; after several weeks, twenty small calculi were passed per urethram, and for several months at varying intervals other calculi escaped, amounting in all to about forty, varying in size from a millet seed to a grain of wheat.
Richardson, M. H.—Boston Med. and Surg. Journ., 1901, cxliv, 83-84.
Krogius, A.—Centralbl. f. Chir. Leipzig: 1902, xxix, 683-686, 1 figure.
Young, H. H.—Amer. Med. Phil: 1902, iv, 209-217, 9 figures.
Noble, Ch. P., & Babcock, W. W.—Amer. Gynecology, New York; 1902, i, 68-78, 2 plates, 3 figures.
Reynolds, E.—Eyll. Free Hosp. for Women. Boston: 1903, No. 2, i, 25-36.
Barling, G.—Birmingham Med. Rev., 1903, i, 305-307.
Young, H. H.—Johns Hopkins Hosp. Bull. Baltimore: 1903, xiv, 93.

Freyer, P. J.—Policlinic, London: 1903, vii, 122.
Herczel, M.—Sebezet. Budapest: 1903, 1.
Wanless, W. J.—Indian Med. Gaz. Calcutta: 1903, xxxviii, 338.
Genouville.—Session d'Association Frans. d'urologie. Paris: 1899, Proc-Verb., 1900, 211-214.
Fenger, C.—Journ. Amer. Med. Assoc., 1894, xxiii, 335-343.
Birk, Albert.—Inaugural Dissertation Halle: 1900, Juli.
Johnson, H. McC.—Interstate Med. Journ., St. Louis: 1901, viii, 580.
Bovée, J. W.—Trans. Amer. Gynec. Soc. Phila: 1904, xxix, 81-91.
Bovée, J. W.—Amer. Journ. Obstet. New York, 1904, 1, 45-49.
Witherspoon, T. C.—New York Med. Journ., etc., 1904, lxxix, 973-976.
Dobson, J. F.—A case of ureterolithotomy. Lancet, London: 1904, i, 368.
Schmidt, L. E.—Amer. Journ. Obstet. New York: 1904, xlix, 509.
Bovée, J. W.—Ureterlithotomy Transactions American Gynecological Society, Phila., 1904, xxix, 81-91.
Cantwell.—1905, Amer. Journ. of Dermat., St. Louis: Octob., 1905, p. 234-237.
Corson, E. R.—Georgia Practician Savannah: 1905, i, 109-112.
Leonard, C. L.—Lancet, London: 1905, 1632-1636.
Lund, F. B., & Smith, H. H.—Boston Med. and Surg. Journ., 1905, clii, 701, 1 pl.
Ransohoff, J.—Lancet-Clinic, Cincinnati, 1905, n. s., liv, 558.
Thorndike, P.—Boston Med. and Surg. Journ., 1905, clii, 659, 1 pl.
Fiori, P.—Policlinics, Roma: 1905, xii, sez, chir., 49-56.
Sampson, J. A.—Ann. of Surg., Phil: 1905, xli, 216-241.
Schmidt.—American Journal Obstetrics, New York, 1904, xlix 509.
Garcia Rijo.—Crong Med-Quir de la Habana, 1905, xxxi, 279.
Bovée.—Washington Medical Annals, 1905, iv, 233-239.

Luning.—Beitrag zur Klinische Chirurgie Tubingen, 1906, xlix, 95-135.
Fiori, P.—Policlin Roma, 1905, xii, sez chir., 49-56.
Robinson, H. B.—Lancet, London, 1905, i, 495.
Deaver, J. B.—Surgery Gynecology and Obstetrics, Chicago, 1906, ii, 369-373.
Daffin.—Lyon Medical, 1906, cvi, 112.
Legueur, F.—Revue Generale de Clin. et de therapeutique, Paris, 1906, xx, 391.
Gibbon, J. H.—Annals Surgery, Phila., 1906, xliii, 742-749, 1 pl.
Heaton, G.—Birmingham Medical Review, 1906, lix, 137-139.
Ashcraft, L. T.—Hahneman Monthly, Phila., 1906, xli, 688-693.
Heresco.—Bulletin et Memoire Societie de Chirurgie Bucarest, 1906-7, ix, 44.

CHAPTER V (c).

URETERORRHAPHY.

1832-1905.

Ureterorrhaphy, suturing the ureter, is done to close lacerated or incised wounds by accident, spontaneous rupture, or surgical intervention.

The material used for this purpose is small sized silk or catgut with a correspondingly small needle; the greatest objection to silk being the accumulation of the urinary salts upon the sutures if they should project into the lumen of the ureter, while catgut will disintegrate before such an accumulation can take place.

BIBLIOGRAPHY.

Braun.—Zerreissung des rechten Harnleiters als Wirkung eines Sturzes von oben. Zeitsch. f. d. Staatsarzneikunde. Erlangen; 1832, xxiii, 375-388.

Purckhaner, H.—Ein Fall von Verletzung des rechten Harnleiters. Aerztl. Intelligenz-Blatt. Munchen: 1866, xiii, 418.

Reichel, P.—Ueber hernienartigen Vorfall eines Ureters durch den Leistenkanal. Verhandl. d. deutsche Gessellsch. f. Chir. Berlin: 1892, xxi, pt. ii, 68-75.

Knotz, L.—Ein bisher noch nicht beschriebener Fall von Ureterenstichverletzung durch das Foramen ischiadicum majus. Prager Med. Woch., 1895, xx, 489-503.

Lavise.—Observation d'ureterorraphie. Ann. de la soc. Belge de Chir. Bruxelles: 1898-9, vi, 349-353.

Albarran, J.—La sonde ureterale a demeure dans le traitement preventif et curatif des fistules renales. Cong. Internat. de Med. Paris: 1900, Sect. de Chir. urin, 69-71.

Kelly, H. A.—Resection and Anastomosis of the Divided Ureter. Journ. Amer. Med. Assoc., 1900. xxxv 860-863. 4 figures.

Gallet.—Urétérorraphie manuel éopratoire et resultat. Ann. de la Soc. Belge de Chir. Bruxelles: 1900, viii, 25-27.

Gubaroff, A. v.—Ueber ein Verfahren zur Restitution des durchschnittenen Ureters vermittelst direkter Vernahung. desselben. Centralbl. f. Chir. Leipzig: 1901, xxviii, 121-123, 6 figures.

Albarran, J. La sonde urétérale a demeure dans le traitement préventif et curtif des fistules renales 13th. Cong. Internat. de Méd. Sect. de Chir. Urin., 1900 Paris: 1901, 69-71.

Allingham, H. W.—A Case of Presumed Rupture of the Ureter from External Violence. Laparotomy Cure. Brit. Med. Journ. London; 1891, i, 699.

Sadoviski, P. T.—Methods of Suturing Wounds of the Ureter. Journ. Akoush. y. Giensk. Boliez., St. Petersburg, 1904, xviii, 27-32.

Smith, L.—Three Cases of Repair of Injuries to the Ureter. Montreal Med. Journ., 1905, xxiv, 229-231.

Cumston, C. G.—American Journal of Neurology New York 1904-5, i 473-487.

CHAPTER V (d).

URETEROURETERAL ANASTOMOSIS.

1891-1905.

Ureteroureteral anastomosis is resorted to for the purpose of reestablishing the ureteral canal after the ureter has been severed by disease, accident, or surgical injury. Several kinds of devices have been employed for the purpose with more or less satisfaction, but the more rational method is by suture. Bovee, in 1897, writes on the subject as follows: Conclusions:

1. "Ureteroureteral anastomosis is a perfectly feasible procedure.

2. Ureteroureteral anastomosis whenever possible is far preferable to any other form of ureteral grafting, to nephrectomy, and to ligation of the ureter.

3. It should be done preferably by lateral implantation or by oblique end-to-end anastomosis, though the transverse end-to-end or end-in-end methods may be safely employed.

4. That constrictions of the calibre of the ureter do not usually follow attempts at suturing in closure of complete transverse section of the duct.

5. That nephrectomy for transverse injuries of the ureter *per se* is an unjustifiable operation.

6. That simple ligation of the ureter to

produce extinction of the function of the kidney is too uncertain to justify its practice.

7. That drainage is not necessary if the wound be perfectly closed and the tissues throughout are aseptic."

BIBLIOGRAPHY.

Rydygier. L.—Przgl. Lek. Krakow: 1891, xxx, 589.

Pousson, A.—Trois cas d'anurie calculeuse suivie d'une analyse de huit opérations d'urétérotomie faites jusqu' a ce jour. Journ. de Med. de Bordeaux, 1891-92, xxi, 15; 25.

Kelly , H. A., & Bloodgood, J. C.—John Hopkins Hosp. Bull. Baltimore: 1893, iv, 89.

Legneux, F.—Assoc. franc. de Chir. Proc-verb. Paris: 1806, x, 932-938.

Bovée, J. W.—Trans. South. Gynaec. Assoc. 1896: Phila.: 1897, ix, 90-126.

Krynski, L.— Centralbl. f. Chir. Leipzig: 1896, xxiii, 73-75.

Bovée, J. W.—Ann. of Surg. Phila: 1897, xxv, 51-79.

Froelich.—Procede Ouveau. Presse Méd. Paris: 1897, ii, 285.

Richardson, M. H.—Trans. Amer. Surg. Assoc. Phila: 1897, 555-559.

Latzka W.—Wien. klin. Runds, 1900, xiv, 736-738, 5 figures.

Taddei, D.—Atti d. Accad. d. Sc. Med. e Nat. in Ferrara, 1902-3, lxxvii 243-251.

Taddei, D.—Clin. Chirurg. Milano: 1904. xii, 528, 569.

CHAPTER V (e).

URETERO-COLON ANASTOMOSIS.

1888-1905.

Uretero-Colon anastomosis was first employed by Tuffier, and is most desired when the ends of the ureter can not be properly approximated; the proximal end is sutured with silk, in an incision made into the gut, and the distal end occluded by ligature. It is an operation that should not be made except in extreme cases, as infection of the kidney will ensue within one or more years.

Uretero-rectal anastomosis was first employed by Fowler, and is less frequently followed by kidney infection than any other uretero-intestinal method employed at this time. It is resorted to in cases where the bladder is removed for cancer, exstrophy or hypertrophy. Kidney infection is less frequent if the implantation is made near the internal sphincter ani. The presence of urine in the rectum does not cause irritation of the rectal mucous membrane.

Fowler says the advantages claimed for this method of operating are as follows:

1. "An efficient permanent valve, with a mucous surface applied to the open mouths of the ureter, is provided. This valve is so situated that it is closely applied to and occludes

the open ends of the ureters as the rectum becomes filled with urine, or when fecal matter descends from above."

2. "Placing the ureters in the submucous space of the rectal wall for a distance of three or more centimetres above the point where these enter the cavity of the rectum affords an additional safeguard against renal infection. In this situation the circular muscular fibres of the bowel-wall compress the ureters and secure occlusion at this point during the act of defecation."

Simon.—In 1851 a loop of thread passed in an ingenious manner, was made to ulcerate through contiguous portion of ureter and rectum in a case of exstrophy of bladder in a boy 13 years of age, communication resulted and continued though urine escaped by skin and the patient died of suppurative pyelitis at the end of one year.

Smith.—In 1871 Smith grafted each ureter into colon on corresponding side, for exstrophy of bladder; operation on left side 14 months after right; death 24 hours, necropsy, left kidney hydronephrotic from stenosis (probe passed along ureter would not enter bowel) obstruction at point of graft on right side kidney showed chronic changes.

Muster.—For cancer of prostate involving bladder Kuster did cystotomy, liberating bladder from peritoneum; then median perineal incision 8 cm. long; cut and isolated urethra below prostate; returning to hypogastrium, cut ureters and lifted bladder and prostate together; transplanted ureters into rectum; su-

tures did not hold; death on 5th day of peritonitis and ascending pyelonephritis.

Chapit.—Sept. 13, 1892, Chapit operated for fistula communicating with vagina and a point high in ureter following vaginal hysterectomy. Ureter dilated, anastomosis is made with posterior surface of descending colon, drain in post-peritoneal space; one year later, no infection had occurred.

Chapit.—Tubercular cystitis and vesical fistula following operation, ureters implanted into rectum 3 months apart, suppression of urine; death same day.

Maydl.—Report of 5 cases done by his plan for ectopia vesicae, one of which died of prolonged narcosis; four cured.

Duplay.—For tubercular and other bladder disease author operated on two cases both of which died; method not explained.

Kossinski.—In 1894 performed vaginal hysterectomy and cystectomy for cancer successfully, and implanted ureters into bowel.

Rein.—Ectopia vesicae Maydl operation suturing in 2 layers. Momentary results good, but according to Boari, abscess formed some time after, and the patient died.

Rosegotti.—Maydl operation for ectopia vesicae; success.

Trendelenburg.—Tubercular left kidney and bladder; removed them and successfully grafted right ureter into Colon.

Vasilyeff.—For malignant disease of bladder performed a successful Maydl operation.

Tuffier.—Alveolar epithelioma of bladder in a man, performed cystectomy with rectal

graft of ureters; death. Details surrounding illness and death not given.

Leet.—Implanted one ureter into rectum; death from irrelevant cause at some later time; autopsy showed no dilatation or infection.

Bergenhem.—Removed bladder and successfully implanted ureters into rectum by Maydl's method.

Schibkler performed an unsuccessful Maydl operation, and Krynski a successful Maydl operation for ectopia vesicae.

Chalot in a case of cancer of uterus removed uterus and implanted both ureters obliquely into rectum, the right an inch below the left; success.

Trombetta performed a successful Maydl operation for ectopia vesicae, and Wolfler did two successful Maydl operations for ectopia vesicae.

Casati.—Vesical tuberculosis. Boari button used for grafting left ureter into colon. Death in 35 days.

Boari.—(loc cit) vesicovaginal fistula with complete destruction of urethra; successful graft in rectum with button.

Herzel performed a successful Maydl operation for ectopia vesicae in a boy of 5 years, removing bladder and inserting both ureters into sigmoid, right at upper and left at lower end incision, and Mikulicz. Maydl operation for pyenephrosis; defective continence and death in 4 months.

Roswell Park performed a Maydl operation
a vesicae; death.

Fritsch.—Had a fatal case of rectal implantation of ureter.

Fowler performed his operation successfully in a case of ectopia vesicae.

Kummel removed bladder of a woman in 1892 and was unsuccessful with rectal grafts of ureters.

Frank performed two successful Maydl operations for ectopia vesicae.

Schnitzler performed two operations of rectal graft of ureters for tubercular and other diseases of the bladder; one died.

Tuffier successfully modified a Maydl operation for exstrophy in boy of fifteen.

Pressat performed a successful sigmoid graft of ureter, and Boari a successful Mayd! operation (with additional piece of bladder mucosa) for exstrophy.

Crespi performed a successful operation according to Boari, Dec. 8, 1896.

Cappello performed a successful Pozza operation for exstrophy, while Pozza modified Maydl's operation in a successful case for exstrophy of bladder by grafting a considerable portion of the trigonum with vesical end of ureters.

Ewald.—Had two successful cases of grafting ureters into sigmoid for ectopia vesicae.

Peters operated for ectopia vesicae and rectal prolapse to knees in a child 5 years of age; extraperitoneal lateral implantation of ureters into rectum; rectal tolerance at once; 5 weeks after operation patient urinated every 3 to 5 hours during daytime and 4 to 5 hours at night.

Cameron operated in a case of ectopia vesicae of 19 years duration.

Wood performed Fowler's operation for vesica ectopia; death 2 months later from kidney infection; high graft.

Herzel reports 2 such cases successfully operated.

von Eiselberg reports 7 Maydl operations with 3 deaths.

von Winiwarter. One of ectopia vesicae; successful Maydl operation and Allen, ectopia vesicae; successful Maydl operation.

Gersuny.—Divided rectum from sigmoid flexure; closed upper opening in rectum and implanted into it the ureters and a part of the bladder wall, thereby forming a new bladder, end of flexure carried down through Douglas's pouch and through the sphincter, where it was sutured successfully.

Nove-Josserand.—For ectopia vesicae did a successful implantation by method differing from Maydl's in that the removal of the bladder is not done until after the graft is made.

Beck.—(Personal communication) Inserted ureteral ends with trigonum into rectum for ectopia vesicae; successful.

Beck.—Grafted both ureters into sigmoid with total exclusion of bladder for tuberculosis of bladder from infection of it after operation for tubercular fistula in ano. Tunnelled bowel-wall and left portion of ureters hanging free in bowel to prevent infection. Operation has been done eight months, and no evidence of infection exists.

—Ureterocolostomy in continuity

of ureter done in 1899; death. Autopsy showed the kidney connecting with colon was tubercular and the other ureter was obstructed with tubercular mass.

BIBLIOGRAPHY.

Tuffier.—Annales des Maladies des. Organes Genito-Urinaires, Paris, 1888, vi, 241-244.

Novaro, G. F.—Atti d Congres d Associatione Medicine Ital. 1887, Pavia, 1889, ii, 187-189.

Giorgano, D.—Riforma Medical, Napoli, 1892, vii, pt. ii. 495-498.

de Forrest, H. P.—Annals Surgery, Phila. 1894, xx, 241-243.

Giordano, D.—Clinical Chirurgie, Milano, 1894, ii, 80-91.

Chaput.—Archives Generales de Medecine, Paris, 1894, i, 5-31.

Roberts, J. B.—Annals Surgery, Phila. 1895, xxii, 363-366.

Viogini, E.— Gazette Medical di Torino, 1895, xlvi, 17-25.

Westermark, F.—Centralblatt f. Gynakologie, Leipzig, 1895, xix, 184-188.

Boari, A.—Policlinic, Rome, 1895, ii-c. 462-470, 2 pl.

Westermark, F.—Hygiea, Stockholm, 1895, lvii, 247-253.

Mauclaire.—Presse Medicale, Paris, 1895, 162-165.

Pisani, U.—Policlinic, Roma, 1896, iii-c. 333-338.

Rosegotti, L.—Giordano di Academie di Medecine di Torino, 1896, 3s, xliv, 372-376.

Amann, J. A.—Verhandlung d deutsch. Gesellschaft f. Gynaologie, Leipzig, 1897, vii, 501-504.

Mathes, P.—Deutsche Zeitschrift f. Chirurgie, Leipzig, 1897, xlv, 136-153.

Kaiser, F.—Centralblatt f. Chirurgie, Leipzig, 1897, xxiv, 1221-1223.

Noble, G. H.—Atlanta Medical and Surgical Journal, 1898-9, xv, 738.

Baldwin, J. F.—Philadelphia Medical Journal, 1898, ii, 1097.

Kelly, H. A.—American Gynecological Journal, New York, 1898, xii, 725-741.

Herczel, M.—Orvosi Hetil, Budapest, 1898, xliii, 407.

Reynier, (P.-et Paulesco.) Bulletin et Memoires de Societé de Chirurgie, Paris, 1898, ns, xxiv, 117-122.

Fowler, G. R.—American Journal Medical Sciences, Phila. 1898, ns, cxv, 270-276.

Martin, F. H.—Journal American Medical Association, 1899, xxxii, 709.

Delbert, P.—Gazette Hebdomadaire de Medecine, Paris, 1899, ns, iv, 13-15.

Bovee, W.—Annals Surgery, Phila. 1900, xxxii, 165-193.

Peterson, R.—Annals Gynecology & Pediatry, Boston, 1900, xiii, 532-537.

Peterson, R.—American Gynecological & Obstetrical Journal, New York, 1900, xvii, 233-240.

Jachontoff, O. P.—Journal Akush i Jensk, Boliez. St. Petersburg, 1900, xiv, 1447-1455, 2 figures.

Alexandroff, S. A.—Allgemeine Wiener Medicinische Zeitung, 1901, xlvi, 545-546; 555-556.

Frank, J.—Journal American Medical Association, 1901, xxxvi, 1466-1469, 3 figures.

Giannettasio, N.—Riforma Medical, Rome, 1901, ii, 242.

Kirkley, C. A.—American Gynecological & Obstetrical Journal, New York, 1901, xviii, 309-312.

Fowler, G. R.—Journal American Medical Association, 1901, xxxvi, 1192.

Woskressenenski Gav. Critique de la procede Khirurgie Moskwa, 1901, ix, 537-564, 2 figures.

Peterson, R.—Journal American Medical Association, 1901, xxxvi, 506-507; 736-738.

Graf, Fritz.—Inaugural Dissertation, Leipzig, 1902, April, No. 35.

Cathelin, F.—Bulletin et Memoires Societe d, Anatomie, Paris, 1903, lxxviii, 289-291.

Taddei, D.—Riforma Medical, Rome, 1903, xix, 717-720.

Robinson, B.—St. Louis Medical & Surgical Journal, 1904, lxxxvi, 133-138.

Harter, Max.—Die doppelseitige Implantation der Ureteren in die Blase und ihre Methodik. Jena, 1904, 50 p.

Streitberger, C. H. O.—Ueber die Implantation des Ureters in die Harnblase. Jena, 1904, 47 p.

CHAPTER V (f).

URETERO-VESICAL ANASTOMOSIS.

1886-1905.

Uretero-Vesical Anastomosis more nearly approaches nature than any other method. The elasticity of both the ureter and bladder make it possible to unite them even when the proximal end of the ureter is very short. Life is less endangered and more extended by this than any other form of anastomosis, and it should be given preference.

Krug reported in 1894 a successful case of implantation of the severed ureter into the bladder; the patient, 30 years of age, had large multiple fibroids, intra-ligamentous. Her condition was complicated by the presence of many abscesses all over the peritoneal cavity, not only of the ovaries and tubes, but also between the intestines. Hysterectomy was performed, and during the course of the operation, I severed the left ureter. The ureter had an anomalous course, running in front of the tumor near the parietes. Ureter implanted into the bladder, bowels moved on third day; entire convalescence smooth. Cystoscopical examination proved the patency of the implanted ureter.

Boldt, in 1899, reported a case of implantation of the ureter into the bladder per abdominal section for the cure of uretero-vaginal

fistula, the patient made a good recovery, the opposite kidney assuming the requisite functions as well as could have been expected.

Reynolds, in 1901 reported a case of vesical implantation of the ureter by Dudley's forceps method after the failure of several plastic operations.

Bovee in 1900 writes a critical survey of ureteral implantations and reports the following cases of bladder implantation or ureter for ureteral injuries during abdominal operation:

Tauffier, in removing a broad ligament cyst, accidentally cut off the ureter, and successfully transplanted it into the bladder intra-peritoneally.

Westermark did a successful transperitoneal graft.

Dunning injured ureter during removal of an abscess from the pelvic structures; transperitoneal implantation into bladder; success.

Matas (personal communication) in removing a large fibroid of the uterus in 1895 found urine spurting from a completely severed ureter one and a half inches from bladder. Successful intraperitoneal bladder graft.

Lannelongue made an unsuccessful bladder-graft of the ureter.

James performed an extraperitoneal bladder graft for stricture of ureter. Fistula resulted, requiring a second operation; successful.

Veit did an extraperitoneal operation by bringing severed ureter out of abdominal incision at point where it passed abdominal wound, where it was fixed by two sutures between fasperitoneum, skin incision being carried

to symphysis and bladder opened extraperitoneally on anterior surface; ureter cut obliquely and sutured into bladder. Recovery.

Pozzi injured ureter during operation and grafted into bladder; nine months later did herniotomy and found ureter size of femoral artery, which he considered due to reflux from bladder when urine was held too long.

Schwartz. Case of transperitoneal graft of ureter in bladder. Recovery.

Baldwin. Operation for sarcoma of fundus uteri cut out one and a half inches of ureter. Could not make ureteroureteral anastomosis, as loss was too great. Performed bladder graft, and as tension was great, sutured bladder to broad ligament. Recovery.

Baldy. Ureter imbedded in inflammatory tissue. It was severed and grafted into bladder intraperitoneally. Success.

Penrose.—Cancer uterus abdominal operation lower portion of ureter involved and resected. Grafted successfully into bladder.

Krug. Same as Baldy's case. Success.

Delagenier, a successful case.

Futh, a successful case.

Polk. Same indications as case of Penrose. Return of disease and secondary operation, at which he found ureter dilated as the duct was too much constricted at lower end.

Fullerton.—A successful case of grafting a double ureter.

Graupner.—Same as Krug's transperitoneal; successful.

Lotheissen.—Same as Krug's transperitoneal; successful.

Veit.—Operation on adnexa; bladder-graft successful. Olshausen. Operation of adnexa; bladder-graft successful.

Podres.—Operation of adnexa; bladder-graft successful.

Hanks.—Transperitoneal operation on one case; successful.

Noble.—An unsuccessful intraperitoneal operation.

Wertheim.—Operation May 30, 1899 for intraligamentary ureteromyoma. Accidental severing, ureter implanted into bladder by means of a sling and knoted silk sutures. Success.

Israel.—Resected bladder for cancer and removed lower end of ureter. Implanted stump at a new place. Recovery.

Schuchard. For bladder resection; success.

Poppert.—For bladder resection; success.

Krause. For bladder resection; died.

Westermark.—For bladder resection; success.

Albarran.—For bladder resection; success.

Verkoogen.—For bladder resection; death in two hours.

Kuster.—For bladder resection, two cases.

Bardenheuer.—For bladder resection; success; patient died five months later from other trouble.

Wertheim.—Operation Dec. 5, 1895, for papilloma of bladder and involvement of left ureter. Removal of tumor part of bladder wall, and ureteral orifice; implantation ureter into the bladder-hole; death in 42 days.

Wertheim.—Removal of tumor with portion

of uterus seven cm. of ureter and portion of rectum, leaving stump of ureter 2 cm. long. Implantation with great difficulty. Fistula established; death occurred shortly after.

Cases of implantation of bladder or ureter for uretero-vaginal and other ureteral fistulae.

Novaro.—Did two successful cases for uretero-vaginal fistula after vaginal hysterectomy.

Martin.—Case failed by vaginal route and was successful by the abdominal extraperitoneal graft.

Kaysar.—Thirteen days after hysterectomy, urine noticed coming through abdominal incision; cut down and performed bladder graft. Sutures drawn out of urethra and fastened to dressings; flow gradually stopped; catheter a demeure; imperfect result; operation repeated 5 months later. For 5 days fastened a weight of 200 grammes to sutures. Success.

Ferguson.—Transperitoneal successful for uretero-abdominal fistula after abdominal operation.

Calderini.—Uretero-vaginal fistula transperitoneal graft; success. This case was in both ureters.

Sokoloff.—Successful transplantation after forceps delivery.

Bazy.—Three successful cases, one requiring a second operation. All for uretero-vaginal fistula following vaginal hysterectomy.

Trendelenburg.—A successful case.

Boldt.—Successful transperitoneal case for uretero-vaginal fistula.

Mackenrodt.—Three cases by the Fritsch-

Kelly method and the first died from nephritis unconnected with the operation.

Latheissen.—Transperitoneal success.

Albarran.—Abnormal attachment of ureter; successful.

Colzi.—Congenital abnormal orifice of ureter in vagina. Incised above and outside labium; detached genitals from arch of pubes cutting away some of the bone from the lower surface of arch to reach base of bladder; abnormal ureter cut across and sutured into place; success.

Rouffart.—Two cases transperitoneal after uretero-vaginal fistula; one died.

Bushbeck.—Transperitoneal operation for ureterovaginal fistula, the second failed and nephrectomy was done.

Tuffier.—One successful case after forceps delivery.

Amann.—Two such cases; success.

Sanger.—One such case; success.

Baker.—Extraperitoneal vaginal; successful.

McMongale.—For uretero-vaginal fistula after laparotomy; success.

Witzel.—Extraperitoneal; vaginal had failed; success. His method is as follows: The bladder was detached and drawn out, the thickened ureter was severed at about the middle of its course through the broad ligament, the lower end closed by sutures, and the upper end brought to the upper part of the incision at the brim of the pelvis, drawn down beneath the peritoneum above the innominate line by a pair of long forceps started upward

near the peritoneum, the incisions in the pelvic peritoneum and median line of the abdomen were closed and the remainder of the operation done extraperitoneally, the bladder was then brought above the middle of the iliac fossa where it was fastened with catgut sutures. The obliquely cut ureter was now inserted into the bladder incision, the mucosa of the bladder and ureter being united by fine catgut and another row outside of it attached to ureter and vesical walls, an oblique channel through the bladder was formed by uniting the bladder walls over the ureter on both sides.

Davenport.—Case similar to Colzi's; success.

Baumm.—Same as Davenport's accessory ureter opening into urethra incontinence suprapubic extraperitoneal misplaced ureter divided proximal end in bladder; recovered.

Amann.—Another successful case for ureterocervical fistula, bladder raised by sound and oblique grafting done; success.

Krause.—Intraperitoneal (following vaginal hysterectomy) cut off ureter, split the end and spliced into bladder, suture through each, hip of ureter brought out and sutured to external meatus urinarius; successful.

Kelly.—Uretero-vaginal fistula after vaginal hysterectomy; loosened bladder from attachments and spliced extraperitoneally; success.

Kelly.—Uretero-vaginal fistula after vaginal hysterectomy; did extraperitoneal operation on wrong ureter, in the first case, by wrong direction of catheter. It failed and he closed

both uretero-vaginal fistulae by plastic operation. The second was done by the Fritsch method and the patient died from pyelonephritis (probably).

Dudley.—Annals Surg. lxxix, 1904, reports a case of uretercystotomy for accidental wound of the ureter in vaginal hysterectomy in a woman 70 years of age, where vaginal hysterectomy for carcinoma of the corpus uteri was performed. With a long slender forceps, the bladder wall was punctured from within outward at the point nearest to the cut end of the ureter. Then, after splitting the cut end of the ureter and denuding the bladder mucosa on either side of the punctured opening, author drew the ureter into the bladder and stitched it there by means of fine chromic catgut sutures. By this means, the split end of the ureter was held widely apart by means of sutures so that it could not easily contract and form a stricture. The tightly fitting ureter made the punctured bladder wound water-tight.

The special advantages of the method as already pointed out are two-fold: 1. A water-tight wound around the ureter where it enters the bladder. 2. Security against contraction of the end of the ureter where it enters the bladder. These advantages in a similar case would lead author named to repeat the operation if the bladder happened to be opened, and he would be inclined to make an artificial vesico-vaginal fistula for this purpose if the bladder was not open.

Lange.—Hysterectomy for cancer by another surgeon, pyonephrosis with right ne-

phrotomy nine months later, a month later median incision and both ureters implanted in fundus of bladder; silk suture brought out urethra and tied over short piece of drainage tube, the right failed and two months, superpubic cystotomy and successful anastomosis, five months, left pyonephrosis and nephrectomy: success.

Wertheim.—Uretero-uterine fistula, following removal of ovarian cyst. Operation January 3, 1896, extraperitoneal changing to intraperitoneal implantation of ureter into bladder. Death in 35 hours.

Schautá.—Vaginal fistula bladder implantation nephrectomy five months later: success.

Benkiser.—Supernumerary left ureter opening into vagina ureterocystotomy; success. This was probably a vaginal operation.

BIBLIOGRAPHY.

Radzimovski, I. V.—Priloj. k Protok Zasaid Obsh Kievsk Vrach 1884-5, Kiev, 1886, 127-149, 1 pl.

Dunn, S.—Paris, 1888.

Krug, F.—American Gynecological & Obstetrical Journal, New York, 1894, v, 495-497.

Razy.—Annales d Maladies d. Organes Genito-Urinaires, Paris, 1894, xii, 481-499.

Tillaux.—Bulletin Academie de Medecine, Paris, 1894, 3 s. xxxi, 341.

Pozzi, S.—Annales d. Maladies d. Organes Genito-Urinaires, Paris, 1895, xiii, 428-433.

Bolt, H. J.—American Journal Obstetrics, New York, 1896, xxxiii, 844-858.

Long, F.—Annals Surgery Phila. 1899, xxx, 513.

Saenger, M.—Monatschrift f. Geburtshulfe u. Gynakologie, Berlin, 1899, ix, 187-205.

Reynolds, E.—Boston Medical & Surgical Journal, 1901, **cxliv, 84-86.**

Krug, Florian.—American Journal Obstetrics, New York, 1902, xlvi, 539-540.

Bozeman, N.—Transactions New York Medical Association, 1887, Concord N. H. 1888 iv, 156-175.

Rouffart.—Greffe de l'uretere sur la vessie. Presse Medical Belge, Bruxelles, 1903, lv, 833.

Racoviceano.—L'uretero-cysto-neostomie. Bulletin et Memoire Soc. de Chirurgie de Bucarest 1904-5, vii, 54-61.

Vaughn, G. T.—Gunshot wounds of the ureter; two cases of uretero-vesical anastomosis. Journal Association Military Surgeons, Carlisle, Pa., 1904. xv, 476-480.

Rescasens.—Uretero-visto-neostomia cistopexia. Rev. espec. Med. Madrid, 1905, viii, 217-222.

Poucel, R.—Uretero-neo-cystostomie, Marseille Medical 1905, xlii, 887.

Chapter V (g).

MISCELLANEOUS SURGERY OF URETER.

1841-1905.

Gerster in 1878 reported a rare form of imperforate anus, malposition of left and obliteration of the ostia of both ureters, with consecutive hydronephrosis of a confluent kidney, operation; death, necropsy. Operation as follows: An incision was made extending from the base of the scrotum to the apex coccygis, the perineal muscles were divided whereupon the contractions of the levator ani became visible; this and the fascia pelvis were also incised, but no intestine presented itself at the bottom of the wound; now the knife was laid aside and the subsequent tissues were separated by the aid of a forceps and the nail of the index-finger to the depth of two inches. "My endeavors says Gerster, to expose the viscus were mainly directed toward the left side of the sacral excavation, and at length a ruffled bulging, gut-like, whitish body, of about the calibre of a small finger, was encountered, being secured by two loops of silk ligature. This was well brought down and incised. Immediately several drachms of a whitish turbid alkaline-smelling fluid—intermixed with white farina-like corpuscles, es-

caped, and it became evident that some portion of the uro-poietic tract was opened. Death 21 hours after operation." Autopsy—The kidneys forming one confluent body, the portion corresponding to the left side being smaller and much less developed than the other. An isthmus of renal substance half an inch wide, connects the two sides of the organ which is situated directly over the spine and aorta. Progressed state of hydronephrosis, two separate, very distended and elongated ureters of the calibre of a small finger originate from the anterior surface of the kidney; their walls are greatly thickened, the right ureter and corresponding part of kidney are filled with a whitish turbid urinous fluid, in which there are suspended small corpuscles resembling grits. The left ureter same as the other, but empty and collapsed; at a distance of half an inch from the ostium, and incised opening is visible in this organ (where it was cut into at the operation). The attachment of the right ureter to the bladder is to be found at the normal site, its ostium being nearly or altogether obliterated (The finest probe could not be passed through it.) The left ureter does not reach the bladder at all, but attaches itself to the medio-posterior and inferior surface of the rectum and is also obliterated at the ostium the rectum a short blind sac is distended by gas and meconium to a diameter of 2 inches and is attached to the upper part of the os sacrum by a short kind of mesentery from which it depends into

the pelvis anteriorly to the insertion of the left ureter and at a distance of ½ inch from it is to be seen a cylindrical band of tissue ⅛ inch long and ⅛ inch wide, connecting the rectum with the bladder there, where the insertion of the ureter is normally situated; a residue of the embryonic cloaca. The finest hair probe cannot pass through the canal perforating this cylinder, but the voiding of meconium through the urethra seems to be conclusive proof of the existence of a passage, however small, through it.

Hunter in 1884 presented before the New York Obstetrical Society an instrument for occluding the ureter. The instrument consisted of a catheter with a fenestra near the end, on the right or left side according to whether the right or left ureter was to be occluded. At the fenestra was a rubber balloon, covered during the introduction of the instrument by a slide, and when in position, distended by quicksilver introduced through the catheter by means of a syringe.

Fenwick in 1888 reported on the value of inspecting the orifices of the ureters by electric light in the diagnosis of "symptomless" hematuria and pturia. He reports three cases and says, these three cases are sufficient to illustrate the value of inspecting the orifices of the ureters by electric light and of excluding the kidneys as a source of the hematuria moreover, the same advantage can be gained in pyuria, and the many methods and instruments advised and devised for obtaining urine

direct from either kidney must now be partially superseded by the electric light. The ureteral orifices are not difficult to find, they are very rarely displaced, and still more rarely are they absent. A little tact in manipulation and knowledge of the cystoscope will bring them into view and amply repay the operator for examining them.

Van Hook in 1893 wrote on the surgery of the ureters a clinical literary and experimental research with the following conclusions:

1. The extra-pelvic portion of the ureter is most readily and safely accessible for exploration and surgical treatment by the retro-peritoneal route.

2. Hence all operations upon the ureters above the crossings of the iliac arteries should be performed retro-peritoneally except in those cases in which the necessity for the ureteral operation arises during laparotomy.

3. The intra-pelvic portion may be reached by incision through the ventral wall, the bladder, the rectum, the vagina in the female, the perineum in the male, or by Kraske's sacral method.

4. The ureter is not only exceptionally well protected from injury, but by its elasticity and toughness resists violence to a remarkable degree.

5. The histology of the ureters furnishes most favorable conditions for the healing of wounds.

6. Longitudinal wounds of the ureter at ıy point heal without difficulty in the ab-

sence of septic processes, under the influence of ample drainage.

7. In all injuries where the urine is septic before the operation, or where the wound is infected during the operation, drainage must be effected.

8. The chemic composition and reaction of the urine must be studied in all injuries to the ureter, the urine being rendered acid if possible and the specific gravity kept low.

9. The pelvis of the ureter is—*caeteris paribus*—the most favorable site for wounds of the ureter, since scar contraction is not so likely there to be productive of ill results.

10. In aseptic longitudinal wounds of the ureter occurring in the course of laparatomy, suture may be practiced and the peritoneum protected by suture.

11. Transverse wounds of the ureter involving less than one-third of the circumference of the duct should be treated by free drainage (extra-peritoneal) and not by suture.

12. In transverse injuries in the continuity of the ureter involving more than one-third of the circumference of the duct, stricture by subsequent scar contraction should be anticipated by converting the transverse into a longitudinal wound and introducing longitudinal sutures.

13. In complete transverse wounds of the ureter at the pelvis, sutures may be used if the line of union be made as great as possible.

14. In complete transverse injuries of the

ureter in continuity, union must not be attempted by suture.

15. In complete transverse injuries of the ureter in continuity, union without subsequent scar contraction may be obtained by the writer's method of lateral implantation as described.

16. In complete transverse injuries of the ureter very near the bladder, the duct may be implanted, but with less advantage, into the bladder directly.

17. At the pelvis of the ureter continuity after complete transverse injury may be restored by Kuester's method of suture, providing the severed ends can be approximated by slightly loosening the ureter from its attachments..

18. Rudygier's method of ureteroplasty in such injuries may be tried if other methods can not be utilized. The primary operation should at least fix the ends of the tube as nearly as possible together.

19. In both transperitoneal and retroperitoneal operations the ureteral ends can be approximated by my method even after the loss of about an inch of its substance.

20. The use of tubes of glass and other materials for the production of channels to do duty in place of destroyed ureteral substance must be rarely satisfactory and even if temporarily successful, the duct is almost sure to be choked by scar contraction.

21. The implantation of the cut ends of a into an isolated knuckle of bowel is ob-

jectionable; 1. Because the bowels is not aseptic; 2. Because the operation is too dangerous.

22. If this is not possible, the ureter if injuredin vaginal operations should be sutured to the base of the bladder with a covering of mucous membrane as far forward as possible with a view to a future implantation or formation of vesico-vaginal fistula with kolpokleisis.

23. In injuries to the pelvic ureter during laparotomy where the continuity can not be restored and where temporary vaginal implantation in the male the proximal extremity of the duct should bt fastened to the skin at the nearest point to the bladder.

24. In ventral ureteral fistulae opening near the bladder, the ureteral extremity may in some instances be planted directly into the bladder without opening the peritoneum.

25. In such cases where the ureter will not reach the bladder, a flap may be raised from the anterior vesical wall and reflected upward extra-peritoneally, to meet the ureter and form a tubular diverticulum.

26. Such a flap may be so elongated by a preliminary operation to transplant the peritoneum back of the fundus or be accurately suturing it there at a single sitting, that median ventral fistulae of the ureter may be cured if they open at any point an inch or more below the umbilicus.

27. Symphysectomy is a valuable and justifiable preliminary step in these plastic vesical operations.

28. It is legitimate when both ends of a cut ureter open upon the abdominal wall to try Rydygier's method.

29. Implantation of one or both ureters into the rectum is absolutely unjustifiable under all circumstances because: 1, the primary risk is too great; 2, there is great liability of stenosis of the duct at the point of implantation; 3, suppurative uretero-nephritis is almost absolutely certain to occur either immediately or after the lapse of months or years.

30. Ligation of the ureter to cause atrophy of the kidney is unjustifiable.

31. Extirpation of a normal kidney for injury or disease of the ureter is absolutely unjustifiable except where the ureter cannot be restored in one or either of the ways cited.

Fenger in 1894 reports a short resume on the surgery of the ureter with the following conclusions:

Accidental wounds and subcutaneous ruptures of the ureter have not as yet been objects of direct surgical procedure upon the ureter at the seat of lesion. It will be advisable, however, when as soon as the diagnosis can be made, or when lumbar opening of a peri-ureteral cavity containing extravasated urine is made, to look for the seat of rupture, and, if practicable, to restore the continuity of the canal.

Catherization of the ureters from the bladder for purposes of diagnosis of diseases of the kidneys has given valuable information affecthe decision for or against operation on

the kidney. The procedure is reasonably practicable in the female by the methods developed by Simon, Pawlik and Kelly.

In man, catherization is practicable only through epicystotomy. The danger of this operation is steadily decreasing. The old mortality, which varied from 27 to 20 per cent., has been reduced in the more recent series of operations (Ultzmann).

Ultzmann 9, 1 death: Albert has had 20 cases with 1 death; Assandelft 102 cases with 2 deaths; Bergman 10 cases; Von Iterson 12 cases; Trendelenburg 6 cases and Antal 3 cases, all without a death. Therefore, this procedure is justifiable in selected cases.

Catherization of the ureter from the bladder as a curative measure for the evacuation of hydro or pyo-nephrosis has occasionally been performed successfully. (Pawlik). It is more difficult and more uncertain than nephrotomy, and the attempt to find and remedy the stenosis of the ureter from the pelvis of the kidney.

Dilatation of strictures of the female ureter by elastic bougies or catheters has been tried from the bladder by Kelly with temporary success and from the pelvis of the kidney by Alsberry successfully. Consequently, this procedure is of use in isolated cases.

Permanent catheterization of the ureter from the bladder, through a fistula or in the case of an implanted ureter is often tolerated only for a limited time, and must be employed with caution for fear of causing ureteritis.

Uretero-lithotomy by longitudinal incision for the removal of a stone is a safe operation heals without stenosis. In extraperitoneal by the extraperitoneal method. The wound operations suturing is unnecessary. Drainage down to the wound is sufficient.

Intraperitoneal ureterectomy should be done only when access outside of the peritoneal cavity is impossible and should be completed by carefully suturing, covering with a peritoneal or omental flap and drainage.

Opening of the peritoneal cavity to locate the seat of the stone may occasionally be necessary, but when the diagnosis is once made, ureterotomy for the removal of the stone should be done through an extraperitoneal incision and the abdomen closed.

In valve-formation or stricture of the ureter causing pyo-or hydro-nephrosis or a permanent renal fistula, nephrotomy should be followed by exploration of the ureter in its entire course from the kidney to the bladder.

Exploration of the ureter as to its permeability should be done from the renal wound by a long flexible silver probe, a uterine probe, or an elastic bougie either olive-pointed or not. If the bougie passes into the ureter, the examination is at an end. The size of the bougie that will pass through a healthy ureter is from 9 to 12 French scale.

If the pelvic orifice of the ureter cannot be found from the renal wound it should be sought for by opening the pelvis by pyelotomy or ureterotomy.

A longitudinal incision half inch to an inch long in the posterior wall of the pelvis can be made while the kidney is lifted upon and against the twelfth rib. This procedure is easy if the pelvis is dilated, but may be impossible if the pelvis is of normal size.

Operation for valve formation should be done through the wound in the pelvis. If the opening cannot be seen or found from the pelvis, ureterotomy should be performed immediately. Below the pelvis a small incision should be made in the ureter and a probe passed up into the pelvis; the valve should be slit longitudinally and the incised borders so treated as to prevent reformation of the valve.

A stricture in the ureter, if not too extensive, can be treated by a plastic operation on the plan of the Heinecke-Mikulicz operation for stenosis of the pyloris, namely: longitudinal division of the stricture and transverse union of the longitudinal wound. This method of operating for ureteral stricture seems to me preferable to resection of the strictured part of the ureter (Kuster's operation) for the following reason: it is a more economical operation and preferable when the elongation of the ureter is not sufficient to permit the two cut ends of the ureter after excision of the stricture not only to come in contact but even to permit of closure by invagination without stretching.

Resection of the upper end of the ureter and implantation of the distal end into the pelvis may be useful in rupture or division or

stricture of the upper end of the ureter as described by Kuster.

In a similar case of stricture in the upper end of the ureter, especially if the ureter were not elongated or the kidney movable, I should prefer the plastic operation proposed by me, as it is easier of technique and as it proved successful in my case of traumatic stricture in the ureter below the pelvic orifice.

The ureter is accessible through an extraperitoneal incision. A continuation of the oblique incision for lumbar nephrotomy from the twelfth rib down along and one inch anterior to the ilium and along Poupart's ligament to about its middle, gives access to the upper three-fourths of the ureter and down to within two or three inches above the bladder.

The vesical and lower pelvic portions of the ureter may be reached as Cabot has pointed out by means of the sacral operation, or Kraske's method modified by osteoplastic temporary resection of the sacrum. In woman the best proportion of the ureter is accessible through the vagina.

The vesical orifice of the ureter may be reached from within the bladder by supra-pubic cystotomy in man or by dilatation of the urethra, supra-pubic or vaginal cystotomy in woman.

Uretero-uterine fistulae can be treated satisfactorily by plastic closure of the vagina or nephrectomy. Implantation of the ureter into the bladder is, under favorable circum-

stances, the operation of the future for this condition.

Uretero-vaginal fistula and congenital urethral or vaginal terminations of the ureter should be treated by vaginal plastic operation for displacement of the proximal end of the ureter into the bladder. If these attempts fail and the kidney is not infected, extra or transperitoneal implantation into the bladder should be done; and finally as a last resort. nephrectomy.

Complete transverse wounds in the continuity of the ureter should be treated by uretero-ureterostomy after Van Hook's method of lateral implantation, if possible.

Complete transverse wounds of the upper end of the ureter should be treated by implantation of the ureter into the pelvis of the kidney as devised by Kuster.

Complete transverse wounds of the ureter near the bladder should be treated by implantation into that viscus either by slitting the ureter or by invagination.

Loss of substance of the ureter too extensive to permit of uretero-ureterostomy or too high up to permit of implantation into the bladder, may be treated by implantation on the skin or into the bowel.

Implantation into the bowel is objectionable on account of the infection which is almost certain to follow sooner or later.

Implantation on the skin in the lumbar region or the abdominal wall, however, is much less dangerous than the primary operation.

Implantation into the rectum should not be resorted to when implantation into the bladder is possible.

Reed, in 1895, wrote an article reviewing ureteral surgery. He says it is astonishing when you look over the literature pertaining to the ureter that prior to 1880, when an article was written by Emmett, we are unable to find anything else on this subject. Following Emmett, we find an article by Staples, written in 1884, and another by Galland of Paris in 1885. From this on, reference to the surgical treatment becomes more frequent until up to the present time there have been written more than eighty different articles pertaining either directly or indirectly to the surgery of the ureters. That the ureter opens up a legitimate field of surgery is beyond a question. That the proper surgical treatment of the ureter may make a nephrectomy unnecessary, or even save life is without controversy. After briefly reviewing the progress made in the last few years in the surgery of the ureter, we are led without further light to the following legitimate conclusions:

1. That where it is possible a traumatism of the ureter should be repaired by plastic operation which has for its object the union of the distal and proximate ends of the ureter.

2. Where it is possible to reach the superior portion of the bladder, it is advisable to implant the distal end of the ureter into the bladder.

Where it is impossible to either unite

the distal or proximal end or implant the distal end into the bladder, we would advise as a matter of choice the implantation of the ureter into the alimentary canal rather than into the vagina or the making of a fistulous opening through the skin.

Davis, in 1900, in an article on the treatment of injuries to the ureters, says that, when division of the ureter occurs, the following would seem to be the rational mode of choosing the method of repair:

1. When possible to perform uretero-ureteral anastomosis; this is the preferable procedure; end-in-end anastomosis, as employed in this case, seeming to me simpler and better.

2. When the distal portion is too short for uretero-ureteral anastomosis, implantation into the bladder should be performed.

3. When there is too much loss of substance to permit uretero-ureteral anastomosis and the proximal end cannot be brought down to the bladder even with the assistance of a diverticulum of the bladder as devised by Van Hook, the procedure with the least objection is probably implantation into the colon.

Gibson in 1900, on a case of uretero-vaginal fistula, with notes of a case for which uretero-cystotomy was performed, says "As regards the causation in this case, there is no doubt but that it was the silk ligature which controlled the hemorrhage from the adhesions mentioned in the case reported that had also been passed around the right ureter. There seems to be reason to believe that had the su-

ture been of less persistent material than silk, e. g., cat-gut, that the ureter would have remained intact till the suture was absorbed, and then resumed its function. I shall not use silk in tying anywhere in the region of the ureter in future.

The other methods of treatment that have been adopted for uretero-vaginal fistula are: (1) Some form of plastic operation by which an artificial vesico-vaginal fistula is made close to the ureteral fistula and then both orifices are encircled in a ring of vaginal denudation and so the urine flows from the ureteral fistula into a loculus in the vagina and then through the vesico-vaginal fistula into the bladder, the drawback to this operation is that you run the risk of adding to the patient's discomfort by giving her in addition a vesico-vaginal fistula, as these delicate operations conducted through a mucous canal are sometimes unsuccessful; (2) partial or total colpocleisis (3) nephrectomy.

The objections to the above-mentioned plastic procedure, "hold good in regard to colpocleisis. Nephrectomy, unless the kidney is diseased beyond recovery, is not to be thought of.

Although not exactly coming under the heading of ureteral fistula, a word may be added in regard to wounds of the ureter occurring during operations. If the ureter is wounded above the true pelvis, it will be impossible to get the proximal end so freed as reach the bladder and so allow uretero-

cystostomy to be performed. In such a case, two methods reported of procedure are open:-

(1) To perform uretero-ureterostostomy. This is the operation, devised by Van Hook of Chicago, by which the upper end of the divided ureter is sutured into the lower. It has been successfully performed by Kelley of Baltimore.

(2) Implantation of the ureter into the bowel. This is a bad procedure, for not only is it apt to lead to septic peritonitis immediately after the operation, and even if this danger is avoided ascending renal infection is likely to take place. In connection with cases where a large piece of ureter has been cut away, as has occurred where it is spread out over a large fibroid, an interesting case is published by Feuth. In his case the above accident occurred and instead of performing nephrectomy, he firmly ligated the divided ureter. Beyond a dull pain in the region of right kidney, and the bladder containing blood, there were no symptoms. These both gradually disappeared and the patient made an uninterrupted recovery. The kidney underwent cystic degeneration and in seven months from operation its place was taken by a large fluctuating tumor, which, however, gave rise to no unpleasant symptoms and about which the patient was perfectly ignorant. In cases therefore in which it is impossible to do uretero-cystostomy or uretero-ureterostomy and the patient's condition will not permit of a nephrectomy, it is advisable to ligate the divided

ureter, postponing the nephrectomy to a later date or avoiding it, if possible, altogether.

Dr. Coe, in 1902, reported cases illustrating ureteral surgery, says: Although my experience in ureteral surgery is too limited to permit any deductions with regard to operative technic, the cases recorded seem to be sufficiently instructive to justify me in briefly referring to them. They at least serve to illustrate the fact that in complicated cases, especially with intraligamentary tumors, it is sometimes impossible to identify the displaced ureters before they are injured and therefore that every suspicious cord, adhesion or supposed blood-vessel should be carefully inspected before it is clamped or ligated, and again after it has been divided. When it is established beyond a doubt by the escape of urine that a ureter has been divided, nothing except the absolutely desperate condition of the patient should deter the surgeon from at once attempting to repair the injury instead of resorting to the unsurgical makeshift of suturing the end of the ureter in the abdominal wound or to the serious procedure of removing a healthy kidney from a patient already depressed by a long and bloody operation.

The well-known difficulties attending secondary operations for the cure of ureteral fistulae, even in the hands of experts, would seem to render it imperative that an attempt should invariably be made to secure immediate repair. As regards the method to be adopted in the individual case no fixed rules can be

formulated. Each must be studied separately. The technique is now sufficiently familiar, at least theoretically, but the opportunities for its application are so rare that few surgeons have an opportunity to acquire such confidence and dexterity in dealing wtih this complication as with others which occur in connection with abdominal surgery.

Noble in 1902 reported clinically upon ureteral surgery with nine cases.

BIBLIOGRAPHY.

Bouchacourt, A.—Passe-lacet introduit dans la vessie par le canal de l'uretere chez un femme extrait a l'aide du brisepierre a percussion. Gazette Medicale de Paris, 1841, 2 s ix 700.

Bouchacourt, A.—Passe-lacet introduit dans la vessie par le canal de l'uretere chez une femme retire au moyen du brise-pierre a percussion. Memoire Societie Medecine d'emulat de Lyon, 1842, i 247-251.

Parvin T.—A successful operation for uretero- vaginal fistula. Eastern Journal Medicine. Indianopolis 1867. ii 603-609.

Gerster, A. G.—A rare form of imperforate anus malposition of left and obliteration of the ostia of both ureters with consecutive hydronephrosis of a confluent kidney, operation, autopsy. New York Medical Journal, 1878, xxviii, 516-521.

Crede, B.—Nephrectomie wegen Ureter-uterusfistel. Archives f. Gynakologie, Berlin 1881, xvii, 312-316.

Hunter, J. B.—Instrument for occluding the ureter. New York Medical Journal, 1884, xxxix 447.

Pawlick.—Ueber Harnleitersondirung beim Weibe und ihre praktische Verwendung. Wiener Medicinische Presse. 1886, xxvii 1425; 1462; 1492; 1557; 1617; 1652.

Novaro, G. F.—Dell innesto degli ureteri nel retto e della esportazione della vesica e della prostata. Bulletin d sez d cult. d Societie Medecine n. r. Accademie d Fisiocrit. di Siena, 1887 v 4, 351.

Fenwick, E. H.—The value of inspecting the orifices of the ureters by electric light in the diagnosis of symptomless hematuria and pyuria. British Medical Journal London, 1868 i 1268.

Kelly, H. A. Palpation of the ureters in the female. Transactions Gynecological Society. Phila. 1888, xiii, 50-65.

Modinski, P. I.—In surgery of the ureter, Medicinische Obozr. Moskow, 1892, xxxviii, 429-454.

Trekaki.—De la greffe de l'uretere. Gazette d'Hopitaux, Paris, 1892, lxv 629-635.

Reed, C. A. L.—Surgery of the ureters with report of cases. Transactions Southern Surgical and Gynecological Association, 1892, Phila., 1893 v 168-186.

Waldeyer.—Ureterscheide. Verhandlung der Anatom. Gesellschaft, Jena 1892, vi, 259.

Cabot, A. T.—Observations upon the anatomy and surgery of the ureter. American Journal of Medical Sciences, Phila., 1892 ns ciii, 43-54.

Kelly, H. A.—My recent ureteral work. Annals Gynecology and Pediatry, Phila., 1892-3 vi 449-460, 4 pl.

Trekaki, P.—Du meat. ureteral artificial (greffe de l'uretere a la paroi laterale ou posterieure de l'abdomen) etude clinique et experimentale. Paris, 1892.

Tuffier.—Resultats eloignes de la chirurgie renale de la nephro-ureterectomie. Association france de Chirurgie. Procverb. Paris, 1893, vii 345-354.

Condamin, R.—Fistule ureterale nephrectomie guerison. Lyon Medical, 1893, lxxiv 341-347.

Tauffier, V.—Some questions on the surgery of the kidney and ureter. Magyzine orv. Archiv. Budapest, 1893 ii 341-403.

Thomson, H.—Ueber die Behandlung von verletzten ureteren. Zeitschrift f. Geburtshilfe u Gynakologie, Stuttgart, 1893, xxvi 173-183.

Reynier, P.—Nephrectomie et ureterectomie totale pour ureterite et pyenophrose d'origine probablement typhique. Bulletin et Memoire Societie de Chirurgie Paris, 1893 ns xix 102-112.

Tauffier, V.—Zur chirurgie der Ureteren (Abstract translated from Magyer Orvosi Archives Budapest, 1893 Heft 5) Pest Medico-Chirurgie Budapest, 1893 xxix 993-996.

Hook, W.—Association 1893 xxi 911; 965.

M.—Case of stone in inferior part of ureter

in which nephrotomy was successfully performed: Svens Lak-Sallsk n Handlung Stockholm, 1894 133-139.

Baldy, J. M.—Surgical injuries to the ureters. American Gynecological and Obstetrical Journal, New York, 1894 v 489-494.

Mackenrodt.—Die operative Heilung der Harnleiterfisteln. Zeitschrift f. Geburtshilfe u Gynakologie, Stuttgart. 1894 xxx 311-319.

Budinger, K.—Beitrage zur Chirurgie des Ureters. Archiv f Klinische Chirurgie, Berlin, 1894, xlviii 639-682.

Modinsky, P.—Beitrage zur Chirurgie der Ureteren. Centralblatt f. d. Krankheiten der Harn. u. Sexual-Organe. Leipzig, 1894 v 198; 241.

Fenger, C.—Annals. Surgery Phila., 1894 xx 257-296.

Fenger, C.—Clinique Bruxelles, 1895 ix 774-790-823.

Reed, R. H.—Jurnal American Medical Association, 1895 xxv 839-842.

Glantenay, L.—Chirurgie de l'uretere, Paris, 1895 293 p.

Reed, R. H.—A review of ureteral surgery. Columbus Medical Journal, 1895 xv 492-504.

Van Hook, W.—Journal American Medical Association, 1895 xxv 842.

Wolfer.—Ueber abnorme Ausmundungen der Ureteren. Verhandlung d. Deutsch. Gesellschaft f. Chirurgie. Berlin, 1895 xxv pt. i 124-131.

Krause, F.—Intraperitoneale ureterales. Presse Medical Paris, 1895 162-165.

Harrison, R.—Surgical diseases of the kidneys and of the ureters. Twentieth Century Practice New York, 1895, i 111-200.

Robb, H.—The surgery of the ureters and kidneys. Cleveland Medical Gazette, 1895-6, xi 129-134.

Enderlin.—Ein Beitrag zur Ureterchirurgie. Deutsche Zeitschrift f. Chirurgie, Leipzig, 1896 xliii 323-328.

Sutton, J. B.—A contribution to the surgery of the ureter. Lancet London, 1896 i 1275-1277.

Burzagli, G. B.—Contributo alla chirurgie degli ureteri. Gazette d ospital Milano, 1896 xvii 1254-1257.

Perkins, G. W.—Extraperitoneal exploration of

the ureter followed by nephrolithotomy. Annals Surgery Phila., 1896, iv 435-542, 4 plates.

Pawlik.—Entgegnung an Prof. Kelly. Centralblatt f. Gynakologie, Leipzig, 1896 xx 708-713.

Bestianelli. R.—Die neuesten Arbeiten uber Harnleiter. Chirurgischer Sammelbericht, Monatschrift f. Geburtshilfe und Gynakologie, Berlin, 1896 iv 65; 167.

Harrison, R.—Extroversion of the bladder treated by left nephrectomy and implantation of the right ureter through the loin. British Medical Journal, London, 1897, i 977.

Gerster, A. G.—Einige Beitrage zur Chirurgie der Niere und des Ureters. New Yorker Medicinische Monatschrift, 1897 ix 189-219.

Bazy.—Hydronephrose par. condure (?) de l'uretere uretero-pyeloneostomie; guerison. Revue de Chirurgia Paris, 1897 xvii 401-409.

Bazy.—Contribution a la chirurgie de l'uretere de l'uretero-pyelo-neostemie. Revue de Chirurgie, Paris, 1897, xvii 400-420.

Delageniere, P.—Chirurgie de l'uretere. Archiv. Provincial de Chirurgie, Paris, 1897, lxxii, 126.

Neuman, P.—The fall af operativa ureterskador. Hygiea Stockholm, 1897. lix, pt. ii 598-609.

Carleton, B. G.—Medical and Surgical Diseases of the Kidneys and Ureters, New York, 1898.

Reynolds, E.—Relation of the ureteral catheters to the surgery of the kidneys in women. Boston Medical and Surgical Journal, 1898, cxxxvii 247-249.

Borlevy, S.—Nephrectomy and surgery of the ureters. Gyogyaszat Budapest, 1898 xxxviii 794-797.

Vineberg, H. N.—Report of a case of nephrectomy for stricture of the right ureter and early tuberculosis of the kidney. Medical Record N. Y., 1898, liii 193.

Englisch.—Ueber die sackformige Erweiterung des Blasenendes der Harnleiter. Wiener Klinische Wochenschrift, 1898 xi 451.

Winslow, R.—Note on the repair of wounds of the ureter. Annals Surgery, Phila., 1898, xxvii 46-48.

Blumenfeld, F.—Ureterenverletzungen bei Laparotomien. Muenchener Medicinische Wochenschrift, 1898 xlv 992; 1029.

R.—Beitrag zur Behandlung der Ureterver-:n. Centralblatt f. Gynakologie, Leipzig, i 729-737.

Hansemann, D.—Ueber Veraenderungen in den Nieren bei Unterbindung des Ureters. Archive f. Physiologie, Leipzig, 1898, 147.

Berg, J.—On the question of the operative treatment of the ureter in tuberculosis of the kidneys. Higiea Stockholm, 1899, lxi pt. ii 394-412.

Desnos.—Nephrectomie avec persistance de la permeabilite de l'uretere. Revue de Chirurgie, Paris 1899 ix, 935.

Car lier, V.—Volumeneuse hydronephrose par calcule de l'Uretere nephrotomie; guerison. Association francaise d'urologie, Paris, 1899 iv 556.

Van Lennep, W. B.—The present status of the surgery of the kidney and ureter. Hahneman Monthly Phila., 1899 xxxiv 545-560.
Monthly Phila.. 1899 xxxiv 454-560.

Tuckerman, L. B.—A device for washing out the pelvis of the kidney through the ureter, with report of a case. Transactions Ohio State Medical Society, Cleveland, 1899, 282.

Galderini, G.—Transperitoneale Eimpflanzung des Ureetrs in die Blase behulfs Heilung der Ureter-gebarmutter-fistel. Monatschrift f. Geburtshilfe u. Gynakologie. Berlin, 1899 ix 174-187.

Wertheim, E.—Demonstratior zur Ureteren-Chirurgie. Verhandlung d. Gesellschaft Deutscher Naturf. u. Aerzte. 71. Vers. 1899, 1900 2 Th. 2. Halfte 202-205.

Krueger.—Ueber Ureterenverletzungen. Berliner Klinische Wochenschrift. 1899 xxxvi 181.

Israel, J.—Beitrag zur Ureterchirurgie. Berliner Klinische Wochenschrift, 1899 xxxvi 201.

Bedinger, K.—Eine Bemerkung zu Ureterfisteln und Ureterverletzungen von Dr. Stockel, Leipzig, 1900. Wiener Klinische Wochenschrift, 1900 xiii 1138.

Landau, L.—Nierenausschaltung durch Harnleiterunderbindungen. Deutsche Medicinische Wochenschrift, 1900 xxvi 749-750.

Rovsking Thorkild. Erfaringer on uretersten Hospital. Tidschrift Kobenhavn, 1900, 4 R. viii, 789-800; 813-818; 835-852.

Thumin, L.—Ureter-dopelbindung und Ligatur in der Blase, in cystoskopisch-photographischer Darstellung. Monatsblatt d. Krankheiten d. Harn-u. Sexual-Appates Berlin, 1900 v. 582-586, 2 figures.

Suarez, L.—Ueber die Besichtigung der Harn-

leiter-mundungen. Centralblatt d. Harn-u. Sexual-Organe, Leipzig, 1900, xi 510-519.

Boari, A.—Ernia dell ureter-destro nel canale inguinale. Ferrara Tip. Bresciani, 1900 9 p.

Stoeckel, W.—Ureterfisteln und Ureterverletzungen, Leipzig, 1900.

Souligoux and Fossard.—Pyonephrose; abouchement de deux ureteres sur le rein gauche malade; nephrectomie; guerison. Bulletin et Memoires Societie Anatomie, Paris, 1900, lxxv, 790-793.

Israel, J.—Chirurgie du rein et de l'uretere traduction de Guillermo Rodriguez A. Preface de J. Albarran, Paris, 1900.

Noble, C. P.—Report of a case of nephrectomy for pyonephrosis due to impaction of a stone in the ureter with remarks on the importance of the early diagnosis and treatment of renal calculi. American Journal Obstetrics, N. Y., 1900, xli 308-311 1 pl., discussion, 372.

Davis, B. B.—Treatment of injuries to the ureters. Journal American Medical Association, 1900, xxxv, 1669-1671, 2 figures.

Israel, J. and Guillermo, R. A.—Chirurgie du rein et de l'uretere. Traduction du Dr. Guillermo Rodriguez A. Preface du Dr. J. Albarran avec un resume de 230 operations renales. Paris Societie d'Ed. Sc., 1900, 210 p.

Fenger, C.—Conservative Operationen fur renale Retention infolge von Stricturen oder Klappenbildung am Ureter. Archiv. f. Klinische Chirurgie, Berlin, 1900, lxii 524-541.

Grieffenhagen, W.—Ueber den gegenwartigen Stand der Nieren—und Harnleiterchirurgie. St. Petersburger Medicinische Wochenschrift, 1900, xvii 427-430.

Lennander, K.—Pyonephrose extirpirt aus einer rechten Niere mit zwei Nierenbecken und zwei Ureteren. Archiv. f. Klinische Chirurgie, Berlin, 1900, lxii 471-494 1 taf 3 fig.

Boari, A.—Chirurgia dell'uretere studio sperimentale e clinico con prefaxione del Prof. J. Albarran. Roma Societie Edition Dante Alighieri, 1900, xiv 444 p.

Paton, E. Percy.—A case of ruptured ureter or renal pelvis. British Medical Journal, London, 1900, i 71.

Wertheim, E.—Beitrage zur Ureterenchirurgie.

Monatsschrift f. Geburtshilfe u. Gynakologie, Berlin, 1900 xi 438-452 2 tabl.

Carlier, V.—Volimineuse hydronephrose par calcul de l'uretere; nephrotomie; guerison. iv Session Association Francaise d'Urologie, Paris, 1899, proc verb ,1900, 556-557.

Solaro.—Sulla tecnica della cura locale dell'uretra mediante liquid. Arte Medical Napoli, 1900, ii12-13.

Cubero, Carillo.—De la incontinencia de orina en la mujer consecutiva a operaciones de restauracion sobre la vejiga y la uretra. Revue espan de sifil y Dermatologie Madrid, 1900, ii 8-13.

Gibson, E. A—.Uretero-vaginal fistula with notes of a case for which uretero-cystostomy was performed. Edinburgh Medical Journal, 1900, viii, 147-151.

Parascandolo, C.—Stato attuale della chirurgia dell uretere. Arte Medicala Napoli, 1900, ii 761-764.

Delbert, P.—Fistule uretero-abdominale tentative d'uretero-cystoneostomie; impossibilite de greffer l'uretere; nephrectomie; guerison. Annales de Maladie d. Organes Genito-Urinaries, Paris, 1900, xvii 1028-1034.

Chiaventone, U.—Greffe extraperitoneale d'un uretere sur la vessie au moyen d'un bouton anatomique modifie pour la traitement d'un fistule ureterale avec graves alterations fonctionelles du rein (Trad). Annael sd. Maladies d Organe Genito-Urinaires Paris, 1900, xviii 507-526 1 figure.

Jonnesco.—Nephrectomie transperitonale pour fistule uretero-vaginale. Bulletin et Memoires Societie de Chirurgie de Bucarest, 1901-2 iv 59-61.

Fraenkel, L.—Versuche ueber Unterbindung des Harnleiters. Archiv. f. Gynakologie Berlin, 1901 lxiv 438-448.

Macdonald, J. W.—Traumatic injuries of the ureter. Medical Dial, 1901 iii 1-4.

Albarran, J.—La sonde ureterae a demeure dans le traitement preventif et curatif des fistules renales consecutives a la nephrostomie. Revue de Gynakologie, Paris, 1901 v 43-90.

Giannettasio, N.—Sulla uretero-eteroplastica richerche sperimentali. Riforma Medical Roma, 1901, ii 242.

Rathjen.—Uber doppelseitigen Ureterverschluss.

Deutsche Medicinische Wochenschrift. Leipzig 1901 xxvii 144.

Davidson, Otto.—Ueber Cysten des menschlichen Ureters. Inaugural Dissertation Leipzig, 1901. No. 50.

Israel, J.—Demonstration einer Zottengeschwulst des Nierenbeckens und des Ureters. Berliner Klinische Wochenschrift, 1901, 655-656.

Rovsking Th. and Stockmann, F.—Erfahrungen uber Uretersteine. Ubersetzt von F. Stockmann Monatsblat f. Urologie Berlin, 1901, vi 385-426.

Feitel, A.—Zur arteriellen Gefassversorgung des Ureters, insbesondere der pars pelvica. Centralblatt f. Gynakologie, Leipzig, 1901, xxv 985-986.

Selbiger, Siegfried.—Ein Fall von tatent verlaufenem Ureterstein. Inaugural Dissertation Leipzig, 1901, No. 13.

Boari, A.—La chirurgie de l'ureter. Annales d. Maladies Organe Genito-Urinaires Paris, 1901, xix 592-595.

Krougliakoff, Sarah.—De la nephrostomie dans l'amurie par retrecissement des ureteres au cour du cancer de l'uterus. Lyon Imperial A Rey, 1901, 68 p.

Grosglik, S.—Zur Kenntniss und chirurgischen Behandlung der angeborenen Harnleiteranomalien, Monatsblatt f. Urologie. Berlin, 1901 vi 577-625.

Weinreb.—Ein Beitrag zur Therapie der Ureterverletzungen bei Laparotomien. Archiv. f. Gynakologie, Berlin, 1901, lxv 161-180.

Logemann, Fritz.—Ein Beitrag zu den Missbildungen des Ureters. Inaugural Dissertation Giessen, 1902 Mai, No. 12.

Albarran, A.—De l'intervention chirurgicale dans les nephrites medicales. Annals d. Maladies d. Organes Genito-Urinaires, Paris, 1902, xx 641-683 5 graph 1 fig.

Lipman-Wulf, L.—Bemerkung zu dem Aufsatze des Herrn S. Grosglik zur Kenntniss und chirurgischen Behandlung der angeborenen Harnleiteranomalien. Monatsblatt f. Urologie. Berlin, 1902 vii 89-91.

Moncayo, B.—Algo sobre le fistula del ureter. Revue val de Cien Medical Valencia, 1902 iv 165-169.

Coe, H. C.—Cases illustrating ureteral surgery. American Journal Medical Science. Phila., 1902, cxxiii 1-4.

Perlis, W.—Zur Ureterenchirurgie: zwei uretero-

ureterorraphiae transverse. Monatschrift f. Geburtshilfe u. Gynakologie. Berlin, 1902, xv 322-341.

Stoeckel, W.—Weitere Erfahrungen ueber Ureterfisteln und Ureterverletzungen. Archiv. f. Gynakologie. Berlin, 1902 lxvii 31-92. 3 figuren 2 taf.

Kelly, H. A.—The advantages of the knee-chest posture in some operations upon the vesical end of the ureters. Journal American Medical Association, 1902, xxxix 291-293 2 figs.

Werder, X. O.—A contribution to ureteral surgery with four cases including a new operation for double uretero-vaginal fistula. Journal American Medical Association, 1902, xxxix 360-363 7 figs.

Herssky, E.—Fortschritte der Nieren-u. Ureterenchirurgie. Heilkunde. Wien, 1902, vi 297-302; 342-354.

Young. H. H.—The diagnosis and treatment of calculus of the lower end of the ureter in the male. Proceedings Philadelphia County Society, 1902, iv 59-92 9 figs.

Noble, C. P.—Clinical report upon ureteral surgery. American Medicine, Phila., 1902, iv 501-504.

Cuthbertson, W. A.—Contribution to the surgery of the ureter with report of a case. Chicago Medical Recorder, 1903, xxiv 110.

Kreisel, F.—A contribution to the diagnosis and treatment of the surgical diseases of the ureter and kidney. Chicago Medical Recorder, 1903, xxiv 112-114.

Young, H. H.—Johns-Hopkins Hospital Bulletin, Baltimore, 1903, xiv 93.

Enderlen and Walbaum.—Ein Beitrag zuh Empflanzung der Ureterem in dem Darm. Beitrage z. Pathologischen Anatomie. Wiesbaden, 1903, 61-89.

Israel, J.—Beitrage zur Chirurgie des Harnleiters. Deutsche Medicinische Wochenschrift. 1903, xxix 6-10.

Young, H. H.—The surgery of the lower ureter. Annals Surgery Phila., 1903, xxxvii 668-710 7 pl.

Israel, J.—Ein kunstlicher Ureter. Berliner Klinische Wochnschrift, 1903, xl 256.

Guilbard, G.—Ligature de la fistules ureterales; ureterotomie externe. Gazette Medical de Nantes 1903, xxi 342.

von Herczel, E.—Durch Uretero-pyelostomie geheilter Fall von Uronephrose. Ungarische medicinische Presse Budapest, 1903, viii 157.

Anziolotti, G.—Ricerch sulle modificazioni indotte nel rene opposto dalla legatura unilaterale dell uretere o dell arteria renale e della nefrectomia. Clinica Moderne Pisa, 1903, ix 62.

Robinson, B.—Surgical course of the ureter. American Journal Surgery and Gynecology, St. Louis, 1903-4, xvii 19-23.

Bovee, J. W.—Uretero-cystotomy. American Gynecology .N. Y., 1903, iii 1-12.

Hildebrand, O.—Ueber einen Fall von Ureter-iss Beitrage z. Klinischen Chirurgie. Tubingen, 1903, xxxvii, 782-787.

Young, H. H.—The surgery of the lower ureter. Transactions Surgical and Gynecological Association, 1902. Phila., 1903, xv 117-169, 5 plates.

Wilcox, D. G.—Surgery of the ureters North American Journal Homeopathy, N. Y., 1903, li 428-430.

Desnos, E.—De la dilatation electrolytique de l'Uretere. Annales Maladie Genoti-Urinaire, Paris, 1903 xxi, 1386-1408.

Preyer, P. J.—On the surgery of the ureters for impacted calculus and some other causes of obstruction. Lancet, London, 1903, ii 583-585.

Kreissel, F.—A contribution to the diagnosis and treatment of the surgical diseases of the ureter and kidney. Medical Brief, St. Louis, 1903, xxxi 1007-1013.

Robinson, B.—General remarks regarding the ureter. Ney Albany Medical Herald, 1903-4, xxii, 304.

Franz, K.—Zur Chirurgie des Ureters. Zeitschrift f. Geburtshilfe u. Gynakologie, Stuttgart, 1903, i 502-545.

Stoeckel, W.—Die intraperitoneale Implantation des Ureters in die Blase. Zeitschrift f. Geburtshilfe u. Gynakologie. Stuttgart, 1904, li 520-536.

Wildbolz, H.—Ueber doppelseitige cystenartige Erweiterung des vesicalen Ureterendes. Monatsblatt f. Urologie, Berlin, 1904, ix 193-198.

Portner, E. -Ueber intermittierende cystische Erweiterung des vesicalen Ureterenden. Monatsblatt f. urologi. Berlin, 1904, ix 296-302.

Fabian, E.—Die Niere des Kaninschens nach der Unterbindung ihres Harnleiters. Biblioth. Med. Abt. Path u. path. anat. Stuttgart, 1904, Hft. xviii, 1-68, 4 pl.

Israel, J.—Ersatz beider Ureteren. Deutsche Medicinsiche Wochenschrift, Berlin, 1904, xxx 911.

Kummell.—Operative Entfernung mehrerer Ureterensteine. Deutsche Medicinische Wochenschrift. Berlin, 1904, xxx 1949.

Kronig.—Ueber doppelseitige Ureterinpflanzung in die Blaze. Zentralblatt f. Gynakologie. Leipzig, 1904, xxviii 346-349.

Neumann, A.—Ein Weg zum vesicalen Ureterende beim Manne. Deutsche Zeitschrift f. Chirurgie. Leipzig ,1904, lxxiv 312-319 1 pl.

Neumann.—Ein Weg zum vesikalen Ureterenere beim Manne. Deutsche Medicinische Wochenschrift, Berlin, 1904, xxx 1452.

Herhold.—Ein Fall von sugkutaner Ureterverletzung. Deutsche Medicinische Wochenschrift, Berlin, 1904, xxx 1335.

Bovee, J .W.—The pogress of ureteral surgery. American Journal of Obstetrics. N. Y., 1904, xlix 742-757.

Groll, L.—Adherences du prepuce et du gland accolement des levres du meat urinaire accolement de la muquese ureterale de la portion anterieure du canal corconcision dilatation. Dauphine Medical Genoble, 1904, xxviii 221-227.

Lichtenauer, K.—Zur Ureterenchirurgie. Monatschrift f. Geburtshilf u. Gynakologie, Berlin, 1904, xix 75-82.

Futh, H.—Beitrag zur ureterenchirurgie. Centralblat f. Gynakologie, Leipzig, 1904, xxviii 537-542.

Rauscher, G.—Ueber die Farbung des Ureterstrahles als diagnostisches Hilfsmittel bei Erkrankungen der Harnorgane. Deutsche Medicinische Wochenschrift, Berlin, 1904, xxx 1788.

Krause.— Plastiken im uretergebiet. Deutsche Medicinische Wchenschrift, Berlin, 1904, xxx 1361.

Hohmeier.—Ueber einem vaginal ausmundenden ueberzahligen Ureter und dessen operative Behandlung. Zeitschrift f. Geburtshilfe u. Gynakologie. Stuttgart, 1904, li 537-543.

De Rinaldis, U.—Resoconto dei piu importanti progressi nella chirurgia degli ureteri N. Progr. internaz. med-chir. Napoli, 1904, i 151-154.

Friolet, H.—Kasuistischer Beitrag zur Ureterresektion mit konsecutiver Ureterocystanastomose. Corespondenz-Blatt f. Schweizer Aerzte, Basel, 1905, xxv 33-42.

Chevassu.—Poche urineuse congenitale de la portion anterieure de l'uretere renfermant trois calcules volumineux et hypospadias penien. Bulletin et Memoires Societies de Chirurgie. Paris, 1905, ns xxxi 682-685.

Deanesly, E.—Cases of ureteral surgery. British Medical Journal London, 1905, i 654.

Klotz, W. C.—Clinical studies in ureteral metoscopy. Medical News, N. Y., 1905, lxxxvi 344-348.

Brown, F. T.—Wound of the ureter during hysterectomy; subsequent nephritis; nephrectomy. Annals Surgery, Phila., 1905, xli 126.

Lichtenaur, K.—Monatschrift f. Geburtshulfe u. Gynakologie Berlin, 1905, xxii 382-388.

Rissman, P.—Monatschrift f. Geburtshilfe u. Gynakologue Berlin, 1905, xxii 389-396.

Fenwick, E.—London, 1903.

Guiterez, G. and J. B.—Revue Medecine de Bogotta, 1904, 5 527-329.

Zondek, M.—Klinische und Anatomische Untersuchungen, Berlin, 1905.

Feroni, E.—Annals di Ostet Milano, 1905, ii 128-148.

F. Cathelin and Pappa.—Association france d'urologie proc-verb., 1905, Paris, 1906, 342-354.

Bernasconi, F. and Comombino, S.—Annales d. maladies Genito-Urinaires, Paris, 1905, ii 1361-1382.

Barker, M. R.—American Journal Dermatology and Genito-Urinary Disease, St. Louis, 1906, x 393-399 .

Deansley.—British Medical Journal, London, 1905, i 654.

Friolet, H.—Correspondenz-blatt f. Schweizer Aerzte Basel, 1905, xxxv, 33-42.

Brown, F. T.—Annals Surgery, Phila., 1905, xli 126.

Suck.—Deutsche Medicinische Wochenschrift Leipzig .1906, xxxii 126.

Chapter VI.

DIAGNOSIS CATHETER AND CYSTOSCOPE.

1875-1905.

Polk, in 1884, in a clinical lecture, says of catheterization of the ureter: The bladder must be empty, the abdomen free, the woman to be put in the knee-chest posture, and the perineum raised so as to distend the vagina with air. The lines are then seen starting from about the points at which we know the ureteric orifices to be situated and running upward and outward, the course of each corresponding to that of the ureter. There is no doubt that in cases of relaxed and distended vagina these lines can be brought out, but in such as present contrary conditions, you will as often fail to find them. But, granting that they may be recognized in all cases, the great defect in the method is the difficulty at ending the determination of the question as to the actual entrance into the ureter. The depth to which you may carry the instrument is but a poor guide. Many bladders are so elastic as to be carried before it even so far as the synchondroses. Given a case in which catheterization of the ureter is demanded as a means of diagnosis, (and every renal tumor requiring extirpation is such a case. Pawlick's method is too uncertain. Should the

patient be a woman, open the base of the bladder, pass your catheter through the urethra, and by means of your finger passed through the artificial opening, you can always insert the instrument into the canals. You collect urine first from one kidney, then from the other, and are in the only sure position to determine the state of the two organs. Should both be diseased, you spare your patient a fatal operation. Should one be sound, by operating you prolong life.

Harrison, in 1884, reported on a study of the dead subject relative to catheterism of the ureters and exploration of male bladder as follows: Lateral lithotomy was performed, the incision into the bladder was extended in front by opening into the membranous urethra with a probe-pointed bistoury, and behind, by cautiously extending the cut into the prostate, to almost the extreme limit of the gland. On subsequently removing the parts, it was found that in this way a considerable opening could be made into the bladder without exceeding what I should regard as a safe limit. Though the opening just described permitted a free access to the bladder for the finger, yet no part of the mucous lining could be inspected even with the employment of suitable retractors. With the assistance of the latter instruments, and by forcible pressure downwards with the hand over the pubes a small portion of the fundus of the bladder could be brought within sight but orifices of the ureters could not be seen nor could any instrument such as a probe introduced into

the bladder through the wound be made to enter them. The cavity of the abdomen was then opened by a median incision above the pubes sufficient to permit of the introduction of three fingers over the fundus of the bladder. By thus pressing the bladder down towards the perineal wound, the whole of the mucous surface could be brought into view, including the orifice of the ureters and the trigone. In one subject, by reason of some enlargement of the prostate, the view of the latter was imperfect. With the object of improving this, the following experiments were resorted to:

(1) Endeavoring to elevate the part by two fingers introduced up the rectum.

(2) By the introduction of a lever up the bowel and

(3) By the whole hand passed into the rectum.

By the first two methods employed, the view of the trigone was not improved, while the hand in the bowel by occupying the whole space obscured everything. When, however, there was no enlargement of the prostate, it was found possible with the hand introduced into the rectum, to bring all parts of the mucous surface of the bladder into sight, including that immediately behind the pubes. It was found quite easy to catheterize the left ureter. The right required a little more looking for. By a bilateral section of the prostate, the search for the latter was facilitated, but the conclusion we came to was that with a natural prostate, this additional inci-

sion was by no means necessary. It seemed not only possible to bring the whole of the mucous membrane of the bladder into view and within reach of manipulation, and to catheterize the ureters, but further, with the hand in the abdomen, to command all hemorrhage from the parts through which the deeper incision would probably pass. The latter point could only be verified on the living subject. It seemed, however, to us a reasonable inference to draw. Abdominal vesical surgery has recently made such important and almost unexpected advances that it does not appear unreasonable to consider, in their application to cases otherwise unprovided for, those operations on the dead subject which have just been described, and were repeatedly verified.

Kelly, in 1892, published an illustrated article on the ureteral catheter, and speaks simply of a few improvements which he has made in Pawlik's valuable instrument, securing what he believes a perfectly satisfactory ureteral catheter. The catheter thus made is a slender metal tube 30 centimetres in length, and 2 millimetres in diameter. At the end which is introduced into the ureter, it is slightly curved for 2 centimetres, and terminates in an olive-shaped point, 1.5 millimetres in diameter. Any further diminution of the size of this point renders it liable to pierce the bladder in the attempt to catheterize the ureter, while, if it is larger, it is difficult to introduce to the ureteral opening. I found that the lateral slit of Pawlik's catheter, which lets the

urine into the catheter, would frequently catch and cut the mucous membrane of the urethra as it was being carried into the bladder. I have replaced this in my own instrument by several perforations in a little gutter countersunk on the concave side of the shaft near the point of the instrument. The opposite end of the catheter at the handle is provided with a lip curving downward to facilitate the discharge and collection of the urine in a finely graduated tube. During the introduction of the catheter, this end of the tube is plugged with a short metal rod. Otherwise the urine would continually escape from the bladder while the orifice of the ureter was being sought. This little rod is attached by a fine chain to the catheter to prevent its being lost. I have placed a fixed metal handle 4 centimetres from the end of the instrument, 6 centimetres in circumference, and flattened on the side toward which the point is directed. This enables one to conveniently hold and direct the instrument in its introduction, and is better than the split movable wooden handle previously in use. The catheter thus constructed is altogether a convenient instrument, and its introduction one of the most delicately pleasing gynecological manipulations. I often thus introduce two catheters at the same time —one into each ureter—when by hanging a little test tube on the end of each, urine is simultaneously collected from both kidneys.

Gaither, in 1895, on catheterization of the ureters in the male, says: In one instance, a man with suspected pyelitis, although the

ureters could be brought into plain view and the catheter was repeatedly put against the mouth of each, it was found impossible to introduce it. Both ureters were surrounded by a circular ulcerated area with a radius of about 5 millimetres. Cocaine anaesthesia was used, but the patient suffered considerable pain, and after about ten minutes of futile effort, refused to allow the examination to proceed further. He would not submit to an attempt under chloroform, and left the hospital without a positive diagnosis having been made. Possibly there was a stricture at the mouth of each ureter, but the appearance on one side was that of an exceptionally patulous entrance. This was the only case in which it was impossible to catheterize the ureters if the vesical and renal conditions were favorable. On several occasions, the ureters could not be located at the first attempt even after diligent and protracted search, and the possibility of this embarrassing complication must be considered in estimating the chances of a successful catheterization. If general anaesthesia is used, the operation can be more easily and quickly accomplished. No great amount of skill is necessary, but one must have knowledge of the appearance of the normal bladder through the cystoscope, the position of the ureters, etc., which can only be acquired by considerable experience. Consequently the operation will probably not become popular among surgeons generally. In chronic nephritis, the catheterization of the ureters is of the greatest value in establishing a correct

prognosis. If the disease is found to be in one kidney, with the other normal or slightly involved, the outlook is favorable. This condition would explain some cases which are seen clinically in which the urine is loaded with albumen and tube casts, but which go on for years without developing serious constitutional symptoms. The information obtained from catheterization will prolong many lives by preventing the surgeon from operating when evidence of advanced disease on both sides is presented, and also by urging an immediate operation when one kidney is normal, with a pyelitis or pyelo-nephritis on the other side exhausting the patient's vitality more each day. If one kidney is slightly diseased, and the other considerably, it will influence the operator to perform a nephrotomy instead of a nephrectomy, thus leaving one kidney to aid its less crippled fellow and possibly turning the balance on the side of life. By following the methods which are now opened to us, the percentage of fatal results after operations on the kidneys should be still further lowered. The time has arrived when no renal surgery should be attempted until after the surgeon has obtained accurate and positive knowledge of the conditions of each kidney by means of the catheterization of the ureters.

Shoemaker, in 1895, writing on an improvement in the technique of catheterization of the ureter in the female, says, that while much advance was made in the difficult matter of ureteral catheterization by Pawlik, Si-

mon, and others who used the tactile method, there can be no doubt that to Dr. H. A. Kelly belongs the credit of a practical suggestion which made the procedure feasible in nearly all cases. This suggestion consisted in the elevation of the pelvis, thus causing distention of the bladder with air, when a catheter or speculum was in the urethra, to allow its entrance; the gravitation upward of the pelvic contents raises the base of the bladder, and so disposes the trigone and the region of the ureteral orifices, that these can be seen by direct light from a head-mirror through a simple tubular speculum open at both ends. Suitable dilatation of the urethra is promised. Dr. Shoemaker says, in catheterization of the ureter, and especially in passing a flexible instrument to the kidney of the detection of obstruction or the draining of collections, it is of very great importance that traumatism be avoided. It is sufficient to use cocaine for all ordinary cases. If the lesion is not more than 10 millimetres above the meatus of the ureter, nothing more than a temporary frequency of urination or slight pain will be encountered, providing everything is aseptic. Lubricating oils should be replaced by boroglyceride and the patient should lie down for a few hours afterwards unless accustomed to the operation. When using a catheter of small calibre with eye in the end, it is some-

served that some of the urine escapes
le of the catheter, a fact to be borne
s estimating the relative secretion of
idneys. It is safer to wash out the

bladder with boric acid solution before and after the manipulation, while particular care should be taken that the mouth of the urethra and surrounding parts are made clean before beginning. Cases are not numerous where the use of the ureteral catheter is necessary. but its field is important, and likely to increase; certainly all cases should submit to this examination prior to a nephrectomy. The writer has now under observation a hydro-nephrosis from obstruction in the ureter due to old pyosalpinx, which was removed. Serious danger has threatened from rupture in cases of hydro-nephrosis. Catherization has shown that nephrectomy is forbidden by the condition of the other kidney. The diseased ureter has now become pervious however, the stricture is under course of dilatation and the sac is being well drained, with great relief to the patient.

Valentine, in 1896, reported an article on ureteral catheterizations, concluding as follows:

1. That there is no object in comparing Nitze's and Casper's ureter-cystoscopes. They are certainly distinct instruments, one often proving most satisfactory when from any individual peculiarity the other fails. I should not consider myself safe without both. The personal obligation under which I am to both Dr. Max Nitze and Dr. Leopold Casper prevents my entering into the question of priority of invention which produced such an unfortunately acrimonious dispute while I was in Berlin. The solution of this question

is I think very gracefully reached by Dr. Meyer when he says: "It seems, we have a right to call this new important instrument Casper-Nitze's ureter cystoscope."

2. There is not the slightest intention herein of criticizing Dr. Meyer's able work or of inviting a controversy. If this leads the many friends of the New York Medical Journal to read Dr. Meyer's article a second time, much benefit to many sufferers from obscure renal and ureteral cases will doubtless result.

Meyer, in 1897, wrote on catheterism of the ureters in the male with the help of the ureter cystoscope, with a report of seven cases. Dr. Meyer says: "I further wish to mention the necessity of good assistance when catheterizing the ureters. I believe it is impossible to do good ureteral work in the male without the trained hand of a capable assistant. I have so far always had and needed the help of my office nurse. She thoroughly knows what I want, how to fix the cystoscope and catheter when I pull out the mandrel, how to steady the instrument when the catheter is in situ, etc. All these points to be observed when carrying out the work may at first seem cumbersome and superfluous, yet I deem them absolutely essential for successful ureteral work in the male.

"In summing up these remarks I should say that repeated disappointment in the early time of ureteral work in the male should not discourage the cystoscopist. On the contrary, should stimulate him to further trials (efts). The reason for his failure should be

sought rather in lack of experience in intravesical cystoscopic work, and also perhaps in lack of proper assistance, than in the imaginary defect of the instruments used for this purpose. Both of the ureter cystoscopes now in our hands are useful and do not need special improvements."

In order to be successful in using Casper's instrument, one will do well, I believe, to follow the rules I have laid down in my former article repeatedly referred to, rules which I have found practical by personal experience. They are, briefly, repeated and revised and extended after my additional experience, as follows:

1. Wash and cocainize the bladder according to well-known rules.

2. Fill the bladder with from five to seven ounces of clear fluid.

3. Introduce the instrument. For this purpose the ureter catheter should be pushed down to the internal opening of the canal of the cystoscope; the lid of the latter should be pulled out about 1-3 inch.

4. As soon as the beak has entered the bladder, the catheter should be gently pushed forward into the vesical cavity by about ½ to ¾ of an inch, and then the lid should at once be pushed back into place, i. e., it should be fully closed.

5. After the interior of the bladder has been satisfactorily inspected, and the ureteral openings have come into view, approach one of them.

6. Let the ureteral opening appear at the

very end of the cystoscopic picture farthest away from the middle of the bladder, but keep it under your direct inspection with the prism as near to it as possible.

7. Push the catheter gently forward if the beak's direction is a proper one, i. e., if it is parallel with that of the lower end of the ureter. I am sure the ureteral catheter will almost invariable easily enter the mouth when conducted by a trained hand.

8. Allow the catheter to proceed not more than one or two inches into the ureter, and withdraw the wire mandrel. Then as a rule urine will begin to flow drop by drop at intervals or continuously.

By faithfully adhering to these rules in my work, I have invariably been successful. Of course the number of patients thus treated is not yet very great, but so far I can repeat conscientiously that whenever, whether in a male or female, I have been able to see and approach the ureteral opening,I have also succeeded in introducing the catheter into the same. I have specially added the words "so far" because I have no doubt that I may probably encounter cases in the future in which my attempts will not be crowned by success, although the uretral openings can be well seen and approached. But up to date, there has been only one among all my cases, male and female combined, that of a lady patient of Dr. E. F. Cushier and Dr. Robert F. Weir of this city, in which I have failed in my repeated attempts, although I saw the opening very distinctly before me. However, in this

patient. I afterward also failed with Kelly's method in repeated sittings. There was no catheter or probe small enough, metal or flexible, to enter the mouth. The reason for this was partially as has been primarily well ascertained with the cystoscope, that the ureter emerged, not as is usually the case, at the innermost end of the ureteral intravesical fold, i. e., nearest the trigonum, but about 1 cm. away from it, upwardly. The consequence was that the ureter catheter, in order to pass on would have had to turn in a sharp angle right after its entrance into the ureteral mouth. This seemed not feasible. Besides, the mouth of the ureter was constricted evidently congenitally. Such strictures we have to put on a basis with the congenital narrowness of the external meatus so often found in the male. By chance I nevertheless succeeded in determining the question at issue, viz.: Is the opposite kidney healthy? I may add this here, because the case really was a perplexing one. There had been an intermittent renal pyluria for the last 2 years. The right kidney was large, easy palpable, slightly painful to the touch. At the third sitting it struck me at once that when washing out the bladder, the water returned clear from the beginning. I concluded that on this day the ureter of the diseased side was most probably temporarily obstructed. Cocainization of the bladder was somewhat prolonged on account of making preparations for the following work. It may have taken in all six or seven minutes. During this time, the patient who

had taken a great deal of fluid before coming to my office discharged five ounces (!) of urine into the bladder. Instead of drawing off 50 cc. of the cocaine solution and perhaps 10-20 cc. of the meanwhile admixed urine, I measured 200 cc. (50 cc. of a two per cent. solution of cocaine had been injected by me). On viewing the bladder after Kelly's method, I saw that the ureter of the presumably diseased side which emptied within the centre of an irregular ulceration did not discharge a drop of fluid. Examination of the 200 cc. of mixed cocaine solution and urine proved the latter to be perfectly normal. In other words, there was a well working healthy opposite kidney. Dr. Weir successfully removed the diseased kidney. The operation as well as the specimen thus obtained proved to be of unusual interest.

Whether we should advise patients to take a large amount of fluid before examination is still a mooted question. In the male, I believe it is a wise plan to drain one kidney after the other, if possible; of course always in the same sitting. That is to say, we can generally not leave the catheter first introduced into our ureter. The proper plan is to liberate it, catheterize the opposite side, leaving the catheter there in situ and then remove the cystoscope. There will be a few urethrae found in the male of sufficiently wide calibre to allow properly moving the cystoscope with the catheter at its side within the urethra. It may often be possible under general narcosis. The latter, however, seems to me should, for

obvious reasons, be avoided as much as possible in this procedure. We drain the kidneys separately for renal disease. And ether as well as chloroform is detrimental to the renal tissue. So far, I have never used or needed general anaesthesia for my ureteral work. This as mentioned above has been office work throughout.

In the male we are therefore limited in the time. The sooner the patient gets through, the better. The more fluid he has taken before the examination, the more rapidly his kidneys will work. Of course due weight must be given this point in drawing conclusions from the urinary analysis. However, as both kidneys have been subjected to greater work at the same time, mistakes can be avoided by a competent analyst.

In the female the case is different. Both kidneys may be drained for hours, provided we do the work at the patient's home or at the hospital. The urine from each can be separated, collected in proper bottles put in the bed. We certainly can state the fact. Urinary analysis will be more satisfactory without diluting the renal secretion too much by previously ingested fluids.

With reference to finding out the amount of work done by each kidney within a given time, I formerly counted the drops that were discharged through the ureter in a certain number of seconds, and also counted the intervals between the different discharges. I have discarded this method since I have distinctly seen jets of urine at the ureteral opening enter

the bladder with the ureter catheter in situ. The urine evidently often drains alongside the catheter besides passing through its lumen. The catheters which accompany Nitze's ureter cystoscope are of more use in this respect than those of Casper's instrument. The former have an end hole behind a scoop-shaped lengthening of the material of which the catheter is made; the whole thus forming a sort of bougie. The latter carry the eye at the side. Nevertheless, I believe that timing the number of drops discharged through the ureteral catheter is an unreliable observation.

My whole ureteral work with a cystoscope according to Nitze's principles, has so far been done with Casper's instrument, this for the simple reason that the first specimen of Nitze's reached me in a damaged condition. Before it was exchanged by the factory more than half a year elapsed. I shall certainly try it the first opportunity that offers.

Whether in the female one should make use of a cystoscope constructed on the Nitze plan or of Kelly's instrument, is really a matter of taste. The manipulation with the imported ureter cystoscope certainly is a very gentle one. It is also very comfortable for the patient. She rests on her back in the position used by us for bimanual vagino-abdominal palpation.

A trained cystoscopist should, in my opinion, be master of all methods "that have proved useful and can be made use of for this purpose." In many instances he may, even in the female, succeed with the one method or

instrument, when the other failed for any reasons whatever.

In the male we have no choice. As explained at length above, Kelly's method for catheterism of the ureters is here a technical impossibility. We need instruments which carry the electric light into the bladder and enable us at the same time to inspect and catheterize the ureteral openings by looking through a telescope and guiding the catheters through a separate channel.

With regard to the indication for catheterism of the ureters,it is,in my opinion, our duty to try and separately collect and analyze the secretion of each kidney "in the male as well as the female" in all so-called obscure urinary diseases, provided the analysis of the bladder urine points to a renal lesion. It becomes our solemn duty to establish the presence, the health, or disease, if possible, also the working power, of the opposite kidney, if nephrectomy has to be done.

If physicians will come to appreciate the importance of this now feasible examination, and make it a point to have cystoscopy and catheterism of the ureters in the male as well as in the female, added to the other means at their disposal for arriving at a definite diagnosis, then the so-called obscure urinary diseases will at least become a thing of the past also in the male, and our diagnosis in the majority of cases will, instead of being mere guess-work, be put on a strictly scientific basis.

Casper of Berlin, in 198, on catheterization of the ureters in both sexes says:

"1. Catheterization of the ureters may be of great value when there is doubt whether there is an affection of the urinary apparatus or not especially in large abdominal tumors where it is doubtful whence they originate. Such cases have been recorded in literature —two by Pawlik, two by Albarran. I have observed three such cases.

2. In some doubtful cases of an affection of the urinary apparatus, the catheterization teaches us if the bladder or the kidney and ureter are the seat of the affection. It is true that in most of these cases, the diagnosis can be arrived at by other means especially by costoscopy, but in cases where the contents of the bladder is cloudy, and where there is only a small focus of suppuration in the kidneys, it may happen that we are unable to determine if the urine which flows from the ureter is clear or cloudy. Clear liquid may impress us as cloudy, and *vise versa*. But the urine we collect through the catheter introduced into the ureter can easily be examined macroscopically and microscopically. We are thus enabled to state with the utmost accuracy if there is any suppurative process or not. I have a record of three such cases. In one case which I have published, a nephrectomy had been performed by a colleague because he observed cloudy urine flowing from the s. At a cystoscopic examination I the secretion of both kidneys clear and

3. If a disease of the kidneys has been diagnosed, the catheterization of the ureters will always show us which kidney is the seat of the disease, and may enable us to state the nature of the malady. This applies only to exceptional cases, for in the majority of cases, we shall be able to say by other means, in which side the malady is localized.

But we know that pain is often deceptive as a diagnostic factor, the pain being localized in the healthy kidney, while the other one contains a calculus. On the other hand, we know from a number of cases that a healthy kidney may be larger through a compensatory hypertrophy than the diseased one. If not for the catheterization of the ureters, we might in these cases locate the seat of the affection on the side which is healthy.

A number of cases have shown that the catheterization of the ureters enable us to recognize the nature of the disease. I impress upon you again, as I stated in the beginning, that the catheterization was only employed, and this ought to be done in all cases where the other diagnostic methods were used without result. As to stones in the pelvis, not much is to be expected. Albarran and myself have occasionally felt a stone in the pelvis with the metallic head of the ureteral sound. But, on the other hand, the fact that we do not feel a stone by no means proves that there is none.

On the other hand, the catheterization of ureter proves more satisfactory in stones being in the ureter, and here it renders ser-

vices far better than any other method. The stones can be felt very plainly, but not only can their presence be diagnosticated, but, and this is of the utmost importance for the treatment, also the part of the ureter in which they are located. I have had three cases of stones in the ureters where I could positively determine the seat of the stones by means of the catheter. In two of them there was absolute anuria.

An entirely new and remarkable observation is that of spasms of the ureter, which I could demonstrate in a case of hysterical oliguria by means of the ureteral catheter. I had previously reported occasionally spasms occurring in the ureter which may simulate a displacement of the ureter at least to the unexperienced eye. In the case of typical hysteria, the spasm of the ureter was found at the same time when there was a period of oliguria.

No urine flowed spontaneously from the ureteral catheter after an injection of liquid into the contracted part of the ureter; however, secretion of the urine took place. These spasms must not be confounded with the formation of folds in the ureters, which may likewise be an obstacle to the ureteral catheter, but these valves can generally be passed if the catheter is skillfully introduced. To the same category belong the cases of real stricture of the ureter, or what is the same thing, distortion or bend of the ureter. They form an impediment to the secretion of urine; generally not to such extent that the latter stops

entirely. Part of the urine flows; the other part being retained in the pelvis. In other cases, there is a decreased renal secretion of urine due to the change in the ureter.

These cases can easily be distinguished from spasms of the ureter, as, in the latter, not a drop of urine flows through the catheter. These obstructions are often the cause of hydronephrosis and pyenophrosis where they may not be due to gonorrheal or tuberculous infection. In a case of a characteristic pyonephrosis, I was able to demonstrate a distortion of the ureter which could be passed only with great difficulty. All other etiological factors could be excluded, and the pyonephrosis was due to the distortion of the ureter. The positive diagnosis of pyelitis, pyelonephritis and pyeonephrosis by means of catheterization of the ureters can be made at the time when we cannot diagnose the disease by any other method. The urine thus obtained shows pus cells which, in a healthy pelvis or in a healthy kidney, are either not found at all, or only in exceedingly small number. The amount of albumen in the urine which was obtained through the catheter gives a clue to the degree of change in the parenchyma of the kidney following a suppuration of the latter. It is needless to state that in deciding this question, all other causes of albuminuria must be considered, and that repeated examinations must be made.

The manner in which the urine flows out and in which the liquid that is injected into the catheter flows in, shows with absolute cer-

tainty if there is a sac or not. In the former case, the urine will flow continually until the sac is empty, and in a greater amount; while in pyelitis, the amount of urine and the way the latter flows out of the catheter will be found the same as in normal kidney or pelvis. If the renal pelvis is not dilated, the patient will feel pain as soon as a small amount of liquid—30 to 50 g.—is injected. If there be a sac, large amounts can be safely injected according to the size of the pouch. I have in a similar case injected 300 g. of water without any inconvenience to the patient.

Catheterization of the ureters is of no great diagnostic value in tuberculosis of the kidneys, since in this affection a diagnosis can be arrived at by other means, but I may mention the case which I have published, where tubercle bacilli were found in the "kidney urine"—an abbreviation which I adopt for the urine obtained through the ureteral catheter —after a careful and repeated examination failed to reveal them in the urine of the bladder. This can be easily explained since bacilli originating in one kidney are comparatively lost in the bladder contents which represent a mixture of urine from both kidneys.

In fistulae of the ureters, the ureteral catheterization enables us to diagnose which ureter is the injured one, and where the lesion is situated. Some cases which I and others have published, prove the value of the method for this purpose.

conclusion, ureteral catheterization
stic value, and I am inclined

to believe that herein lies its main usefulness—in determining the condition of the healthy kidney when the other one had been found diseased.

It is necessary to mention the cases where a nephrectomy has been done, although the patient only had one kidney, or those cases where this operation proved fatal because the other kidney was not in a condition to discharge the necessary functions of urinary secretion. Since the catheterization of ureters enlightens us about the condition of the other kidney, it is obvious that the indications and contraindications for nephrectomy can be placed on a sounder basis than heretofore.

If a repeated examination shows that the urine of a kidney is clear, normal, free of albumen or of cylinders, and contains a normal amount of urea, the conclusion is warranted that his kidney does its work well, and that it is capable of performing the function for the diseased one after the removal of the latter. On the other hand, we know that a kidney the urine of which contains a large amount of albumen or of pus blood or cylinders, and a smaller amount of urea, will not be able to do the work for both since the urinary secretion is impaired to such an extent that compensation cannot take place.

The conclusions which were arrived at after Ashard's and Cataigne's experiments as to the passing of methylene blue through the kidney are open to criticism. This will be a fruitful field for further researches. We shall, I believe, with our present knowledge of the con-

dition of the urine, be able to reduce the mortality in cases of nephrectomy, since this operation is to be considered as contraindicated where we have cause to assume that the other organ is not in a condition to do the work for both kidneys.

In conclusion, without being too sanguine or enthusiastic, I claim that the diagnosis of diseases of the kidneys has been rendered considerably more certain and exact through the catheterization of the ureters.

Vinneberg, in 1900, reporting a case of nephrectomy for ascending tuberculosis, with some remarks on cystoscopy and catheterism of the ureters in women, says: He has used the ureteral catheter over one hundred times in fully fifty patients, and has never as yet seen any ill results excepting some pain of variable severity for the twenty-four hours following the event. Thus far, I have not met with a single instance in which the patient had any febrile disturbance,so far as I know, consequent upon catheterism of the ureters. I have always carried out the procedure without an anaesthetic, in the knee-chest posture, and the patients have been able to go home from my office shortly afterwards.

Diagnostic Purposes of Catheterism of the Ureters:

1. To determine in a given case of urinary affection whether the bladder or kidney is affected.

2. To determine which kidney is the one [illegible]ved.

In a case of pyonephrosis to ascertain

the function of the other kidney by withdrawing the urine directly from it.

4. To determine the presence of a calculus in the ureter or pelvis of the kidney (Howard A. Kelly).

5. To determine abnormal congenital conditions of the ureter as a double ureter with an opening into the urethral canal or at the side of the meatus.

6. To determine the presence of ureteritis (Kelly, and case reported by the writer later on).

7. To detect the presence of stricture of the ureter and its location (Kelly and the writer).

8. To determine the seat of obscure pain in the side (Kelly).

Therapeutic Uses of Catheterism of the Ureters:

1. To cure certain cases of pyonephrosis by irrigations of the pelvis of the kidney with various medicated solutions. (Kelly and Casper).

But as Israel pointed out in the discussion that followed Casper's paper, the cause of pyonephrosis, in which the irrigation treatment could be of any possible benefit, are very limited in number. The following conditions are essential to success.

(a) The pus collection must be limited to one sac in the pelvis of the kidney.

(b) The pus must be fluid and non-viscid;

(c) It must be non-tuberculous;

(d) It must not be due to the presence of a calculus lodged in the pelvis of the kidney;

(e) There must not be a non-permeable stricture of the ureter;

(f) There must not be any perinephritic suppuration.

The absence of any of these features in a given case of pyonephrosis is very rare, as Israel was able to demonstrate by a large collection of specimens.

2. The dilatation and cure of stricture of the ureters when not due to tuberculous ulceration (Kelly).

3. The removal of small calculus lodged in the ureters and obstructing the flow of urine (Kelly & Casper).

4. In radical operation for carcinoma uteri, the introduction of catheters into the ureters prior to the operation forms a valuable guide to avoid injuring the ureters.

Gross, in 1902, on the diagnostic and therapeutic value of ureteral catheterization says: Ureteral catheterism has secured its well-earned place in therapeutics, and concludes as follows:

Diagnostic Value. To determine:

1. Whether the blader or the kidney is the seat of affection.
2. The presence or absence of a kidney.
3. Which kidney is involved.
4. The site of the lesion.
5. The functional capacity of each kidney.
6. The presence of strictures in the ureter and their exact location.

The diagnosis and site of ureteral fis-

The presence of a pyoureter.

10. A differential diagnosis between diseases of the kidney and the surrounding organs.

11. At times a tuberculosis of the kidney.

12. The diagnosis of a pyelitis, pyelonephritis, pyonephrosis, hydronephrosis, movable kidney, neoplasms of the kidney, renal lithiasis.

13. Abnormal congenital conditions of the ureter. Therapeutic Value:

1. To cure pyelitis and certain cases of pyonephrosis and hydronephrosis.
2. To drain pocket formations.
3. To dilate strictures of the ureters.
4. To dislodge small calculi of the ureter.
5. To drain the kidney after nephrotomy.
6. To prevent injury to and stitching together of the ureter in certain operations.
7. To prevent and cure renal fistulae.
8. As a guide to certain operations on the pelvis of the kidney.

There is comparatively little or no danger of infection if one carefully disinfects his instruments and thoroughly irrigates the urethra and bladder.

The fact that it takes practice and skill should not discredit the method, considering its importance as a therapeutic and a diagnostic factor.

Van Der Poel, N. Y. M. Journal, 1904, writing on ureteral catheterism as a routine method of diagnosis in renal disease, offers the following conclusions:

I. The cystoscope is more easy of introduction than are the separators or segrega-

tors; is less painful during the bladder manipulation, and much less so during the collection of the urines. Hence as a rule:

II. With ureteral catheterism, we can collect the urine during as long a time as may be thought necessary, the patient not requiring any supervision.

III. A cystoscopic examination of the bladder can be made at the same time, which in some cases is useful; in others indispensable.

IV. We are much more certain of the exact results, especially when the two urines are of a similar character, whether clear blood or purulent (Albarran): and,

V. It is the only method by which we are fairly certain that there is no bladder contamination.

Jour. A. M. A., xlii, 1904.

Schmidt writes an extensive illustrated article on the problems of the technic of ureteral catheterization and says:

While the rapid development of kidney and ureteral surgery in recent years has put ever-increasing demands on refined diagnosis, it is remarkable that one of the most necessary and expedient means for this aim, ureteral catheterization did not become popular among the surgeons. Surely to a great extent this was due to the lack of a complete and authoritative treatise concerning the appropriate instruments and to the absence of a practical discussion and minute explanation of the technic. T[illegible] a large number of surgeons who, [illegible]cious to catheterize ureters, still

have neither the time nor the material nor the intention to work through all the failures, mistakes and disagreeable experiences connected with the adoption of a rather new and peculiar instrumentation. Others, after studying the pertinent literature, are disappointed because in actual application they find out that a great many of the instructions laid down are either not explicit enough, or faulty, or are simply advertisements for certain obsolete or inadequate instruments. The tireless ambition of some authors to be mentioned as pioncers in new methods produces so-called original articles on endovesical operations; ureteral catheterization, and so on, which, through their author's experience, represent nothing else but the reproduction of half-digested and misinterpreted remarks made by experts, or, at best, conclusions based on the fact that the author was made half-way familiar with one, and only one method. Happy on account of having chanced occasionally into a ureteral opening, with unconscious self-criticism, he will praise the method which was demonstrated to him as the only correct one and so on. For a broad discussion of ureteral catheterization, it is necessary to be thoroughly familiar with cystoscopy in general, and to have had experience with the different instruments and methods on various patients with different sensitiveness, different conditions of the bladder and under different circumstances.

The various principles on which the instruments are built are discussed and criticized ac-

cording to the demands made on them.

Casper's latest cystoscope for ureteral catheterism.

Nitze-Albarran single-barreled and double-barreled cystoscope.

Schifka's modification of Casper's instrument.

Bierhoff's modification of double-barrel Nitze-Albarran cystoscope.

Brenner's ureteral cystoscope.

The Tilden Brown double-barreled catheterization instrument.

The Bransford-Lewis instrument of direct view.

Snell's cystoscope with movable tube. And Kolischer-Schmidt's modification are illustrated and described.

BIBLIOGRAPHY.

Dr. Wood told Dr. South of having suppression of urine. Dr. South informed him if he didn't make water he would make earth. Vol. 1, p. 156.

Recorde educated at Oxford. Elected fellow of All Saints College 1531, created doctor of Medicine at Cambridge, 1545. Taught mathematics at Oxford, excelled all others in that department. He knew rhetoric, astronomy, geometry, music, minerology, Saxon language. Joined the divinity, wrote many books among them: "The Urinal of Physik", 1547 in which he described the urinary vessels, giving kinds of urine, saying that their aid to diagnosis was uncertain. Died 1538 in Kings Bench Prison where he was confined for debt.

Duplay.—Bulletin et Memoires Societe de Chirurgie, Paris, 1860, ns vi, 93-97.

Simon, C. J. F. L. G.—Ueber die Methoden die weibliche Urinblase zugangig zu machen und ueber die Sonderung des Harnleiters beim Weibe. Sammlung Klinischer Vortrage Leipzig, 1875, No. 88 (Gynakologie) No. 28.

Tuchmann.—Ueber den kunstlichen Verschluss und ueber die Sondirung des Harnleiters. Deutsche Zeitschrift f. Chirurgie. Leipzig, 1875-6, vi, 560-584.

Grunfeld, J.—Ueber Sondirung des Harnleiters. Allgemeine Wiener Medicinische Zeitung, 1876, xxi, 223.

Pawlick.—Ueber die Sondirung der Harnleiter der Weiblichen Blase aus freier Hand ohne vorbereitende Operation. Tageblatt d. Versammlung Deutscher Naturf. u. Aerzte, Salzburg, 1881, liv, pt. ii. 179.

Munde, P. F.—Diagnosis of ureteritis by vaginal touch. American Journal Obstetrics, New York, 1883, xvi, 526.

Silbermann, O.—Ueber eine neue Methode der Temporaren Harnleiterverschleissung und ihre diagnostische Verwerthung fur die Krankheiten des uropietischen Systems. Berliner Klinische Wochenschrift, 1883, xx, 518-521.

Polk, W. M.—New York Medical Journal, 1884, xl, 281-283.

Newman, D.—Instruments for catheterization and compression of the female ureters; also a method of inspecting the female bladder by means of the electric light. Transactions Glasgow Pathological and Clinical Society, 1884-6, ii, 94-97.

Harrison, R.—Lancet, London, 1885, i, 198 Pawlik.—Ueber die Harnleitersondirung beim Weibe. Archiv. f. Klinische Chirurgie, Berlin, 1886, xxxiii, 717-739, 1 pl.

Sanger, M.—Ueber Tastung der Harnleiter bein Weibe. Archiv. f. Gynakologie, Berlin, 1886, xxviii, 54-77.

Warnots, L.—Du catheterisme des ureteres chez la femme. Journal de Medecine et Pharmacologie, Bruxelles, 1886, lxxxiii, 357.

Warkalla, A.—Ueber Absperrung der Harnleiter von der Scheide her zu diagnostischen Zwecken nach Versuchen an der Leiche. Archiv. f. Gynakologie. Berlin, 1886-7, xxix, 289-307.

Jacob fils.—De l'utilite du catheterisme des ureteres dans les fistules uro-genitales. Archive d'Obstetrique et de Gynecologie, Paris, 1888, iii, 435-446.

Robson, A. W. M.—Nephrotomy after catheteri-

zation of ureters. British Medical Journal, London, 1888, ii, 561-601.

Poirer, P.—Catheterisme des ureteres. Comptes Rendus Academie d Science, Paris, 1889, cx, 409-411.

Heydenreich, A.—Le catheterisme des ureters. Semaine Medicale, Paris, 1889, ix, 49.

Keen, W. W.—Five cases of supra-pubic cystotomy, three for stone, one for tumor in the bladder, and one for exploration with catheterism of the ureters, one death. Medical News, Philadelphia, 1891, lviii, 427-434.

Albarran, G. & Liuria H.—Catheterisme permanent des ureters. Comptes Rendus, Societie Biologie, Paris, 1891, 9 s, iii, 543-587.

Kelly, H. A.—American Journal of Obstetrics, New York, 1892, xxv, 768-771.

Wells, B. H.—Catheterization of the ureters in the female. New York Journal, Gynecology and Obstetrics, 1893, iii, 283-289.

Kelley, H. A.—Johns Hopkins Hospital Bulletin, Baltimore, 1893, iv, 101.

Kelley, H. A.—American Journal Obstetrics, New York, 1894, xxix, 1-19.

Casper, L.—Der Catheterismus der Ureteren. Allgemeine Medicinische Zeitung, Berlin, 1895, lxiv, 37.

Witzel, O.—Centralblatt f. Gynecologie, Leipzig, 1896, xx, 289-293.

Kelley, H. A.—A reply to Prof. Pawlick's claim to the discovery of examining the bladder and catheterizing the ureters in women. American Journal Obstetrics, New York, 1896, xxxiv, 259-261.

Kollman, A.—Die Nitze'Schen Ureterkystoskope. Centralblatt f. d. Krankheiten d. Harn-und Sexual-Organe, Leipzig, 1895, vi, 227-229.

Gaither, A. B.—Journal Cutaneous and Genito-Urinary Disease, New York, 1895, xiii, 491-495.

Shoemaker, G. E.—Annals of Surgery, Phila,. 1895, xxii, 650-654.

Brown, J.— Catheterization of ureters in the male. Johns Hopkins Hospital Bulletin, Baltimore, 1895, vi, 12-15.

Nitze, N.—Zum Katheterismus der Harnleiter beim Manne. Centralblatt f. Chirurgie, Leipzig, 1895, xxii, 217-220.

Viertel.—Demonstration des Nitze-schen Harn-erkathetercystoskops. Jahresbericht d Schles.

Gesellschart f. vaterland. Cultur, 1895, Breslau, 1896, lxxiii, 1 abth. Med. Section, 75-77.

Mackie, W.—Catheterization of the uterus (female) as a diagnostic measure. Annals Gynecology and Pediatry, Boston, 1896-7, x, 719-727.

Dasara Cao D.—Ll-caterisme permanente degli ureteri dopo la espicistotomia. Policlinic, Roma, 1896, iii C. 540-544.

Valentine, F. C.—New York Medical Journal, 1896, lxiii, 541.

Meyer, W.—New York Medical Journal, 1896, lxii, 369-373.

Kolischer, G.—Der katheterismus der Ureteren beim Weibe. Wiener Klinische Wochenschrift, 1896, ix, 1155.

Holscher, R.—Ueber Katheterization der Ureteren. Munchen. Medizinsche Wochenschrift, 1897, xliv, 1431-1435.

Krotoszyner, M.—Catheterization of the ureters; its indications and contra-indications. Transaction Medical Society, California, 1897, 346-350.

Albarran.—Ein neues Ureterenkystoskop und dessen Anwendung. Centralblatt f. d. Krankheiten d. Harn-und Sexual-Organe. Leipzig, 1897, viii, 697-707.

Albarran, J.—Nouveles observations de catheterisme cystoscopique des ureteres. Presse Medicale, Paris, 1897, iii, 274-276.

Sutherlin, W. K.—Ueber Kystoscopie und Katheterismus der Ureteren. Berlin, 1897, 32 p.

Nitze, M.—Eine neue Modifikation des Harnleiterkatheters. Centralblatt f. d. Krankheiten d. Harn-und Sexual-Organe, Leipzig, 1897, viii, 8-13.

Just, P. A. F.—Nogle Bemerkninger om cystoskopi og ureterkatheterization hos kvinder eiter den Kelly-Pawlik's ske metode. Ugesk f. Laeger Kobenh, 1897, 5 R iv, 1115-1122.

Albarran, J.—Technique du catheterisme cystoscopique des ureteres. Revue de Gynecologie et de Chirurgie, Paris, 1897, i, 457-478.

von Federoff, S.—Zur Cystoskopie bei blutigen Harn mebst einigen Betrachtungen uber den Katheterismus der Ureteren. Berliner Klinische Wochenschrift, 1897, xxxiv, 716-718.

Winter, G.—Ueber Cystoskopie und Ureterkatheterismus beim Weibe. Zeitschrift f. Geburtshilfe

u. Gynakologie, Stuttgart, 1897, xxxvi, 497-516. Discussion 547-563.

Jervell.—Ureterkatheterisation hos kvinder efter Kelly's metode. Forh. v nord Kirurgie foren 3 je mode, i Helsingfors, 1897, Stockholm, 1898, 60-62.

Meyer, W.—Medical Record, New York, 1897, li 613-623.

Ureterkaterisation hos qyinder efter Kelly's metode. Hospital Tidschrift, Kjobenh r R v 807-809.

Albarran, J.—Cystoscope pour le catheterisme des ureteres. Association France d'Urologie Proc-Verb, 1897, Paris, 1898, ii, 446-455.

Verhoogen, J.—Le catheterisme des ureteres. Policlinic Bruxelles, 1898, vii, 53-60.

Podrez, A. G.—On uretero-cystoneostomie a clinical study. Laitop Russk Chirurgie, St. Petersburg, 1898 iii, 644-662.

Englisch, G.—Ueber cystenmartige Erweiterung des Blasenendes des Harnleiters. Centralblatt f. d. Krankheiten d. Harn-und Sexual-Organe, Leipzig, 1898, ix, 373-406.

Boisseau du Rofcher.—Cystoscopie et catheterisme des ureteres. Annales des Maladies Organe Genito-Urinaires. Paris, 1898, xvi, 475-503.

Kelly, H. A.—A preliminary report upon the examination of the bladder and the catheterization of ureters in men. Annals Surgery, Philadelphia, 1899, xxvii, 71-73.

Saxtorph, S.—Nog lebemaerkinger om ureterkaterisation med forevisning af et nyt cystoskop. Ugesktr f. Laeger Kobenh, 1898, 5 R v, 241-259.

Impert, L.—Le catheterisme des ureteres par les voies naturelles. Gazette des Hopitaux, Paris, 1898, lxxi, 645-651.

Kelly, H. A.—The catheterization of the ureters in the male through an open cystoscope with the bladder distended with air by posture. Johns Hopkins Hospital Bulletin, Baltimore, 1898, ix, 62.

Fenwick, E. H.—On catheterization of the male ureter under electric light. British Medical Journal, London, 1898, i, 131-135.

L.—Le catheterisme des ureteres par les relles. N. Montpellier Medical Supple-, vii, 65-121.

Ueber Cystoskopie und Ureterkatheteris-Medicinische Wochenschrift, 1898,

Casper, L.—On catheterization of the ureters in both sexes. British Medical Journal, London, 1898, ii, 1412-1414.

Casper, L.—Therapeutische Erfahrungen ueber den ureterenkatheterismus. Berliner Klinische Wochenschrift, 1898, xxxv, 1094—Ibid, 1899, xxxvi, 27; 41.

Podrez, A. C.—On uretero-cystoneostomia. A clinical study. Laitop Russk Chirurgie, St. Petersburg, 1898, iii, 644-662.

Casper, L.—Monatschrift d. Arztlichen Polytechnique, Berlin, 1898, xx, 69.

Kelly, H. A.— Further use of the ureteral catheter. Maryland Medical Journal, Baltimore, 1899, xli, 141.

Desnos, E.—Indications du catheterismus des ureteres. Presse Medical, 1899, xx, 167-169.

Albarran, J.—Tuberculose renale diagnostique per le catheterisme ureteral nephrectomie. Bulletin et Memoires Societe Chirurgie, Paris, 1899, xxv, 827.

Israel, J.—Was leistet der Ureterkatheterismus der Nierenchirurgie? Nach der Discussion zum Vortrage des Herrn Casper. Therapeutische Erfolge des Ureterkatheterismus. Berliner Klinische Wochenschrift, 1899, xxxvi, 39-41.

Landau, T.—Der Harnleiterkatheterismus in der Gynakologie Discussionsbemerkungen zu dem in der Berliner Medicinischen Gessellschaft gehaltenen vortrage des Herrn Casper: Therapeutische Erfahrungen uber den Ureterkatheterismus. Berliner Klinische Wochenschrift. 1899, xxxvi, 39-41.

Bazy.—Note sur le catheterisme ureteral et sur l'intervention precoce dans la tuberculose renale. Bulletin et Memoire Societe de Chirurgie, Paris, 1900, xxvi, 983-984.

Casper, L.—Ueber Fortschritte des Ureterkatheterismus. Medicinische Woche, Berlin, 1900, lii, 483-848.

Illyes Geza de.—Le catheterisme des ureteres applique a quelques methodes nouvelles de diagnostic des maladies des reins. Annales d Maladies d Organe Genito-Urinaires, Paris, 1900, xviii, 1233-1252.

Bruni, C.—Cistoscopia e catheterismo degli ureteri. Atti dr Accademie Medicine, Chirurgie, Napoli, 1900, liv, 112.

Casper, L.—Zum Ureter-katheterismus. xiii

Congres international de Medecine. Sect. d Chirurgie Urinaire, 1900, Paris, 1901, 67-69.

Hamonic, P.—Uncas de retention d'origine renale guerie par le catheterisme de l'uretere. xiii, Congres internationale de Medecine Sect. de Chirurgie urinaire, 1900, Paris, 1901, 42-43.

Schlifka, M.—Ein neues kystoskop zum Katheter mus der Ureteren. Wiener Klinische Wochenschrift, 1900, xiii, 11-12, 1 Figure.

Hamonic, P.—Nouveau systeme de catheterisme conducteur et Nouveaux instruments metalliques pour la dilatation progressive de l'uretere. iv, Session Association Francaise d'Urologie. Paris, 1900, Proc-Verb. 1900, 576-579, 2 figs.

Ciuti, G.—Sul valors diagnostico e terapeutico del cateterismo degli ureteri. Rivue Critique di Clinical Medicale. Firenze, 1900, i, 319-329.

Kreps, M.—Weitere Beobachtungen uber den Katheterismus der ureteren. Centralblatt f. d. Krankheiten d. Harn-und Sexual-Organe, Leipzig, 1900, xi, 169-173.

Pousson.—Note sur la valeur du catheterisme ureteral. Bulletin et Memoires Societe de Chirurgie, Paris, 1900, xxvi, 829-831.

Imbert, L.—Le catheterisme des ureters ses indications et ses dangers dans la tuberculose renale. North Montpellier Medicale, 1900, 2 s, xi, 97-113.

Lipman-Wulf.—Demonstration eines Ureterdivertikels. Deutsche Medicinische Wochenschrift, Leipzig u. Berlin, 1900, xxvi, 267.

Kollmann, A.—Und Wossidle, H.—Uretercystoskop mit nebeneinander liegenden Gangen. Centralblatt f. d. Krankheiten d. Harn-und Sexual-Organe, Leipzig, 1900, xi, 461-470, 1 fig.; 471-474, 2 figuren.

Hamonic, P.—Un cas de retention d'origine renale guerie par le catheterisme de l'uretere. Revue Clinic d'andrologie et de Gynecologie, Paris, 1900, vi, 225-226.

Casper, L.—Sur les progres dans le catheterisme des ureteresfl. Medicinische Obozorisk, Moskow, 1900, liv, 456-458.

Stockman, F.—Casuistische Mittheilungen zur therapeutischen Anwendung des Harnleiterkatheterismus. Wiener Klinische Rundschau, 1900, xiv, 873-874; 896-898.

—ar.—Eine Verbeserung meines Harnleiter-

cystoskops. Monatsblatt d. Krankheiten d. Harn- und Sexual-Organe. Berlin, 1900, v, 327-330.

Gagen-Torn, J. E.—Le catheterisme des ureteres son application aux nephrites tuberculeuses et calculeuses. Vratch, St. Petersburg, 1901, xxii, 1217-1219 3 figures; 1235-1258.

Albarran, J.—Tuberculose renale et pyelite tuberculeuse diagnostiques au debut de leur evolution par le catheterisme ureteral nephrectomie lombaire guerison. Bulletin et Memoires Societe Chirurgie Paris, 1900, xxvi, 975-977.

Vineberg, H. N.—New York Medical Journal, 1900, lxxii, 360-400.

Poirer.—Tuberculose renale et catheterisme ureteral. Bulletin et Memoires Societe Chirurgie, Paris, 1900, xxvi, 729.

Bazy.—Rein tuberculeux enleve par nephrectomie. Inutillite due catheterisme prealable de l'uretere. Bulletin et Memoires Societe Chirurgie, Paris, 1900, xxvi, 902 L.

Illyes Geza v.—Der Ureterenkatheterismus im Dienste einiger neuer Methoden der Nierndiagnostik. Deutsche Zeitschrift f. Chirurgie, Leipzig, 1901, lxi, 377-392.

Zembruski, L.—Le catheterisme des ureteres. Gazette lek Warszawa. 1901, xxi, 742-750; 769; 777.

Lewis, Bransford.—Ureter-catheterism in the male. A new ureter-cystoscope. American Journal Dermatology and Genital-Urinary Disease, St. Louis, 1901, v, 104-109.

Federoff, S. v.—Ein Kleiner Kniff zur Technik des ureterkatheterismus. Centralblatt f. Chirurgie, Leipzig, 1901, xxviii, 332-333.

Schtein, M. A.—De la cystoscopie et du catheterisme des ureteres avec la description d'un appareil perfectionne. Ejened, St. Petersburg, 1901, viii, 128-138.

Adrain, C.—Die diagnostische Bedeutung des Ureterenkatheterismus. Centralblatt f. d. Grenzebeiten d. Medicine u. Chirurgie, Jena, 1902, v, 888-897.

Rochet & Pellanda.—La separation des urines par compression des orifices ureterovesicaux dans la vessie ellememe. Gazette Hebdomadaire de Medecine, Paris, 1902, vii, 1177-1181.

Gross, L.—New York Medical Journal, 1902, lxxvi, 441-447.

Margoulies, M.—Deux cents cas decatheterisation des ureteres. Khirurgie Moskwa, 1902, xi, 441-460.

Bierhoff, F.—A new cystoscope for the simultaneous catheterization of both ureters and for double current irrigation of the bladder. Medical News, New York, 1902, lxxx, 444-445, 3 figures.

Matas.—The treatment of renal fistula by catheterization of the ureter, illustrated by a case in which a renal fistula of five months duration was cured. Proceedings Orleans Parish Medical Society, New Orleans, 1902, N. S. i, 5-10.

McKinnon, A. I.—Uretercyctostomy. Medical Herald St. Joseph, 1903, xxii, 21.

Lewis, V.—Ureter-catheterism. Its purposes and practicability with the presentation of a ureterocystoscope for male and female. St. Louis Courier Medicine, 1903, xxviii, 331-347.

Elsner, S. L.—Simultaneous catheterization of both ureters its advantages and technique with new instruments. Annals Gynecology and Pediatry, Boston, 1903, xvi, 457-462, 1 pl.

Young, H. H.—Calculus of lower end of left ureter with stricture below it extraperitoneal iliac ureterolithotomy and intra-vesical division of stricture. Johns Hopkins Hospital Bulletin, Baltimore, 1903, xiv, 93.

Keefe, J. W.—Catheterization of the ureters, Providence Medical Journal, 1903, iv, 161-176.

Kolischer, G.—The possibilities of ureteral catheterization. Wisconsin Medical Journal, 1903, i, 347-351.

Spooner, H. G.—Catheterization of the ureters. Post Graduate, New York, 1903 xviii, 677-680, 2 plates.

Lewis, B.—Method of catheterizing both ureters in the male subject; making use of the ureter-cystoscope of his own devising. Medical Fortnightly, St. Louis, 1903, xxiv, 565-578.

Smith, C. A.—Uretero-cystostomy with traction on the ureter. Northwest Medicine, Seattle, 1903, i, 61-74.

Marguillies, M.—Zweihundert Falle von Katheterismus der Ureteren. Monatsblatt f. Urologie, Berlin, 1903, xiii, 449-470.

ischer, G.—The mechanic movements in the
nic treatment of kidney and ureteral dis-
is Medical Journal, 1903-4, v, 458.

Sheftel, B. G.—Importance of cystoscopy and catheterization of the ureters in general, and for surgery of the kidneys in particular (with presentation of Nitze's uretero-cystoscope) Russk. Vrach, St. Petersburg. 1903, ii, 1606; 547.

Bovee, J. W.—Ureterocystostomy. Transactions American Gynecological Society, Philadelphia, 1903, xxviii 208-230.

Perilliat, J. L. C.—Catheterization of the uterus in the female. New Orleans Medical and Surgical Journal, 1903-4, liv, 520-532, 1 pl.

Cohn, T.—Ueber cystenartige erweiterung des harnleiters innerhalb der harnb. lase Beitrage z. Klinische Chirurgie. Tubingen, 1903-4, xli, 45-78.

Kreissl, F.—A contribution to the diagnosis and treatment of the surgical diseases of the ureter and kidney. Illinois Medical Journal, Springfield, 1903-4, ns v, 883-888.

Lower.—Medical News, New York. 1903, lxxxiii, 1168-1170.

Johnson.—Interstate Medical Journal, St. Louis, 1904, xi, 250.

Harris.—Australasian Medical Gazette, Sydney, 1904, xxiii, 111-114.

Van Der Poel.—New York Medical Journal, 1904, lxxix, 721-726.

Cabot.—Medical Record New York, 1904, lxv, 519.

Kapsammer, G.—Ueber ureterkatheterismus und funktionelle nierendiagnostik. Wiener Klinische Wochenschrift, 1903, xvi, 1417-423.

Johnson, H. McC.—A case of ureteral disease simulating cystitis with unusual tenesmus following ureter catheterization.—Interstate Medical Journal, St. Louis, 1904, xi, 250.

Van der Poel, J.—Ureteral catheterism as a routine method of diagnosis in renal disease. New York Medical Journal, etc., 1904, lxxix, 721-726.

Rafin.—Le catheterisme ureteral therapeutique ureponephrose colibacillaire aseptissee par les lavages du bassinet. Annales d. maladies d. Organes Genito-Urinaires, Paris, 1904, xxii, 519-521.

Ingianni, G.—Catheterismo dell uretere in un caso di genicolatura di questo condotto e e ritenzione renale. Policlinic, Roma, 1904. xi, sez chir. 90-96.

Klose, B.—Radiographie eines durch das kystoskop diagnostizierten Falles von kompletter Ureter-

enverdopplung. Deutsche Zeitschrift f. Chirurgie, Leipzig, 1904, lxxii 614-617, 1 pl.

Gobell.—Ueber die Bedeutung des Ureterenkatheterismus fur die Nierenddiagnostik. Munchen. Medicinische Wochenschrift 1904 li 86.

Dudley, E. C.—Ureterocystostomy for accidental wound of the ureter in vaginal hysterectomy. Annals Surgery, Phila., 1904, xxxix, 755, 4 pl.

Kolischer, G. & Schmidt, L. E.—The problems of a technic of ureteral Catheterization. Journal American Medical Association, 1904, xlii, 1476-1487.

Bergoner, C. J.—Suggestions for catheterization of the ureters, difficulties encountered. Medical Standard. Chicago, 1904, xxvii, 515.

Cuthbertson, W.—Report of a case of ureterocystostomy. American Journal Surgery and Gynecology, St. Louis, 1904-5, xviii, 4.

Robinson, B.—A brief history of cystoscopy and ureteral catheterization. Detroit Medical Journal, 1904-5, iv, 202-207.

Barbat, J. H.—Uretero-cystostomy with report of case. California State Journal Medicine, San Francisco, 1904, ii 249.

Stokes, A. C.—Cystoscopy and catheterization of the ureters. Medical Herald, St. Joseph, 1904, ns. xxiii, 482-486.

Baumgarten, S. A.—A useful instrument for catheterization. Urologie, Budapest, 1904, 62-65.

Illyes, G.—Ueber die Ureterkatheterisirung als therapeutischen Eingriff. Ungar. Medicinische Presse, Budapest, 1904, ix, 435-437.

Illyes, G.—Ureteral cathéterization as a curative intervention. Orvosi hetil, Budapest, 1904, xlviii, 495-497.

Bremerman, L. W.—The technique of cystoscopy and ureteral catheterization. American Journal Urology, N. Y., 1904-5, i, 315-320.

Lewis, B.—Report of operative work in the ureter through the author's catheterizing and operating cystoscopes. American Journal Urology, N. Y., 1904-5, i, 134-163; 3 pl.

76, Differential Diagnosis of Ureteral Calculus. (Medical Mirror, March, 1905.)

77. Differential Diagnosis of Ureteral Calculus—from pain. (Medical Fortnightly, May 25, 1905).

78. Differential Diagnosis of Ureteral Calculus—from Palpation. (Mil. Med. Jr., May, 1905).

Dodge, W. T.—Catheterization of the ureters. Journal Michigan Medical Society, Detroit, 1905, iv, 58-62.

Brown, F. T.—The cystoscope and ureter catheter in the diagnosis of surgical diseases of the kidney and ureter. Medical News, N. Y., 1905, lxxxvi, 442-444.

Illyes, G.—Ueber den therapeutischen ureterkatheterismus. Deutsche Zeitschrift f. Chirurgie, Leipzig, 1905, lxxvi, 33-41.

Raffin.—Separation endo-vesicale et catheterisme ureteral. Lyon Medical, 1905, civ, 316-330.

Thumin, L.—Was leistet die Cystoskopie bei verletzungen der Blase und der Ureteren? Munchen. Medicinische Wochenschrift, 1905, lii, 406-409.

Raffin.—Le catheterisme ureteral therapeutique dans les pyelitis simples. Association France d'urologie Proc.-Verb, 1904, Paris, 1905, viii, 774-777.

Tenney, B.—The diagnosis of renal and ureteral calculi Boston Medical & Surgical Journal, 1906, clii, 660-663.

Robinson, B.—Differential diagnosis of ureteral calculus. St. Louis Medical & Surgical Journal, 1905, lxxxviii, 289-297.

Schmidt, L.—Some newer methods in use in the diagnosis of ureteral and renal diseases. Chicago Medical Recorder, 1905, xxvii, 491-499.

Robinson, B.—Differential diagnosis of ureteral calculus Kansas City Medical Record, 1905, xxii, 147-150.

Robinson, B.—The differential diagnosis of ureteral calculus from pain. Medical Fortnightly, St. Louis, 1905, xxvii, 237-243.

Fenwick, E. H.—The value of the use of a shadowgraph. Ureteric bougie in the precise surgery of renal calculus (Abstract.) British Medical Journal, London, 1905, i, 1325-1327, 4 pl.

Lewis, B.—Report on operative work in the ureter through the author's catheterizing and operative cystoscopes. Lancet-Clinic, Cinti., 1905, ns, liv, 245-262.

Bross E,—Az ureterkatheterismusrol. Budapest orvorosi ujsag, 1905, iii, 389-391.

Robinson, B.—Differential diagnosis of ureteral calculus. Milwaukee Medical Journal, 1905, xliii, 108-116.

Bremerman, L. W.—American Medicine, Phila., 1905, x, 995-998.
Day, R. V.—California Medical and Surgical Reporter, Los Angeles, 1905, i, 434-437.
Ayres, W.—New York State Journal Medicine, New York, 1905, v, 329-333.
Abbott, A. W.—St. Paul Journal, 1905, vii, 822-832.
Bremerman, L. W.—American Journal Urology, New York, 1904-5, i 315.
Fontanilles, P. E.—Lyon, 1904.
Lewis, B.—Report of operative work in the ureter through the author's catheterizing operative cystoscopes. American Journal Urology, New York, 1904-5, i, 134-163, 3 pl.
Illyes, G.—Orvosi hetil Budapest, 1904, xlviii, 495-497.
Thumin, L.—Berliner Klinische Wochenschrift, 1905, xlii, 905-911.
Freudenberg, A.—American Journal Dermatology and Genito-Urinary Diseases, St. Louis, 1905, ix, 295.
Jones, G. W.—International Journal Surgery, New York, 1905, xviii, 353.
Grillo, Antonio C.—Torino, 1905.
Klotz, W. C.—Medical News, New York, 1905, lxxxvi, 344-348.
Brown, F. T.—Medical and Surgical Reports Bellevue Hospital, New York, 1905, i, 353-371.
Jones, G. W.—International Journal Surgery, New York, 1905, xviii, 353.
Furniss, H. D.—Medical Record, New York, 1905, lxviii, 373-376.
Harris.—Medicine, Detroit, 1905, xi, 588-592.
Bierhoff.—American Journal of Surgery, 1905, xix, 69.
Jones.—American Surgery and Gynecology, 1905, xviii, 158.
Recasens.—Revue espec. Medicine, Madrid, 1905, cv, 19-23.
Abbott, A. W.—Journal Minnesota Medical Association, 1905, xxv, 473-478.
Klussman, H. A.—American Journal Dermatology and Genito-Urinary Disease, St. Louis, 1905, ix, 369-373.
Adrian.—Deutsche Medicinische Wochenschrift, Leipzig, 1905, xxxi, 1860.

Raffin.—Lyon Medical, 1905, civ, 316-330.
Ayres, W.—New York State Journal Medicine, New York, 1905. v, 329-333.
Boice, C. A.—Medical Fortnightly, St. Louis, 1905, xxviii, 465-468.
Dodge, W. T.—Journal Michigan Medical Society, Detroit, 1905, iv, 58-62.
Illyes, G.—Deutsche Zeitschrift f. Chirurgie, Leipzig, 1905, lxxvi, 33-41.
Bremerman, L. W.—American Medicine, Phila., 1905, x. 995-998.
Gagman, A. N.—Russk Chirurgie Archiv., St. Petersburg, 1905, xxi, 302-319.
Bierhopf, F.—American Journal Urology, New York, 1905-6, ii, 320-233.
Day, R. V.—California Medical and Surgical Reporter, Los Angeles, 1905, i, 434-437.
Adrian, C.—Archiv. f. Klinische Chirurgie, Berlin, 1905, lxxviii. 588-598.
Boross, E.—Budapesti Orv. Ujsag, 1905, iii, 389-391.
Stewart, D. H.—American Journal Urology, New York, 1905-6, ii, 477-480.
Mark, E. G.—Journal Missouri Medical Association, St. Louis, 1905-6, ii, 745-750.
Nitze, M.—Centralblatt f. d. Krankheiten d. Harn u. Sexual-Organe, Leipzig, 1905, xvi, 113-122.
Smith, O. C.—New England Medical Monthly, Danbury Conn., 1906, xxv, 10-20.
Freudenburg, A.—Annals d. Maladies d. Organe Genito-Urinaires, Paris, 1906, xxiv, 401-411.
Robinson, B.—American Practitioner and News Louisville, 1906, xl, 1-9.
Klotz, W. C.—Surgery Gynecology and Obstetrics, Chicago, 1906. ii, 498-502.
Hein, C.—Zentralblatt f. Gynakologie, Leipzig, 1906, xxx, 369-374.
Dumitriu, G.—Revue de Chirurgie, Bucarest,
Beer, E.—Annals of Surgery,, Phila., 1906, xliv, 553-558.
1906, x, 16-20.
Lewis, B.—Three ureters demonstrated during life ureter catheterization giving three different urines, one infected with gonococci. Medical Record, New York, 1906, lxx, 521-524.
Cannaday, J. E.—Medical Record, New York. 1906, lxx, 822-825.

Chapter VII.

PROLAPSE.

1862-1905.

Prolapse of the ureter may be congenital or acquired, usually congenital.

Bloomer reported thirteen cases of prolapse, ten of which were congenital. Acquired prolapse is usually the result of calculus, which is in the prolapsed portion. Either form of prolapse is infrequent, but it may occur at any age, in either sex, and vary in degree from a slight prolapse into the bladder to an extension through the outer opening of the female urethra.

It is usually gradual, caused by relaxation of its attachments, but it may be produced suddenly by trauma.

Smith, in 1863, before the Pathological Society of London presented a case of prolapsus of ureters into bladder. (Specimen case):

"The bladder was much hypertrophied; the ureters were each about an inch in diameter and their walls were greatly thickened; the kidneys were enormously dilated, being each about nine inches long; their secreting structure wasted and their distended pelves containing purulent urine; the left kidney had within it two irregularly-shaped calculi."

"On opening the cavity of the bladder, one or two mucous caculi were found protruded outwards between the muscular fibres. The

vesical ends of both ureters were found to be prolapsed, forming pendulous pouches into its cavity. The openings of the ureters were reduced to mere pinhole apertures situated on the most prominent part of each pouch (through these, bristles have been passed in the specimen); the pouch formed by the left ureter was the larger, that formed by the right enclosed a stone about the size of a cob-nut which hangs pendulous into the bladder."

"This particular condition of ureters, so far as I know, has not been met with before. At first sight, the prolapsus might be thought to be due to the escape of a stone from the kidney sticking at the vesical end of the ureter and gradually by its weight and by the pressure of urine from above carrying down with it the lower end of the ureter into the cavity of the bladder. But the fact that the prolapsus of the left ureter which is greater than the right, neither contains a stone nor is its orifice large enough to have allowed one to escape, compels us to seek some other explanation. Nor could the muscular force of the bladder in its efforts to expel the urine have produced this condition of the ureters, since that would act in an opposite direction to the force which could pouch-out a ureter into the cavity of the bladder."

Caille, in 1888, reported a case of prolapse of the inverted lower portion of the right ureter through the urethra in a child two weeks old. Necropsy: Both uerters dilated. The right ureter was double with double insertion into the hilus, both branches converging in

their downward course and terminating by a single opening in the bladder.

From a careful review of this unique case, it would appear that owing to the formation of a warty or papilomatous small growth in the right ureter near its vesical insertion, a partial or complete occlusion of the ureter took place, in consequence of which the small tumor was pressed into the bladder, and finally through the urethra, carrying with it or dragging along the inverted lower third of the ureter, which presented in the form of a sac. The sac was supposed to be a diverticulum of the bladder, owing to the fact that at no time was it possible to insert a probe into the opening in this sac to a greater depth than when inserted at the side of the sac into the bladder proper, and at no time was a discharge of urine noticed to take place from this sac.

Ogle, in 1894, presented before the Pathological Society of London a specimen of dilated ureter and pelvis of the left kidney with prolapse of ureter into the bladder. The pelvis of the left kidney substance deficient; the left ureter is dilated to the size of a pencil, the opening into the bladder admits a fine bristle. Into the bladder projects a sac of the size of a small pea communicating with the dilated ureter from which it can be filled by pressure and the small opening of the ureter can be seen on its surface. This opening is natural in size and pervious to fluid. No cause for the dila-

tation was found. No stone can be felt in the little sac nor was there any such seen in other parts of the urinary tract.

Ann. Surg., xxxix, 1904.

URETER IN AN INGUINAL HERNIA.

Dr. Hartwell exhibited a specimen of a hydronephrosis with ureter attached, stating that the patient from whom the specimen was removed was a man, sixty-two years old.

The hernial contents were the caecum, the appendix, a foot of the colon, and ten inches of small intestine.

Lying behind and outside the hernia proper, but inside the scrotum, was a round, firm cord, in which a canal could be made out. It was a half inch in diameter, and the portion in the scrotum was about six inches long. It lay in the shape of a loop with the convexity downward, and the two ends passing behind the neck of the hernia into the pelvis. Its course could not be traced beyond this point, and its nature was uncertain, a prolapsed ureter and a dilated vein being considered possibilities.

On account of the dense adhesions, the hernial operation took a long time, and upon its completion the loop of cord mentioned was pushed up behind the peritoneum and left there. Death.

At the autopsy, the unidentified cord proved to be a ureter prolapsed in a loop into the scrotum behind the peritoneum, probably pulled there by the colon in its descent, the hernia being of the so-called "gliding" variety. The kidney from which this ureter descended was

found to be the seat of a large hydronephrosis, the position of the ureter acting as an obstruction to the outflow of urine. This obstruction was probably intermittent, because on straightening the ureter, the urine flowed freely into the bladder.

Dr. Hartwell said that the only similar case he could find on record was reported by von Bergmann in his Surgery.

Prolapse of the ureter has been reported by Caille in a child two (2) weeks old. A sac which was supposed to be a vesical diverticulum presented at the ureteral orifice. It was found to be a prolapsed ureter, dragged down by a papillomatous growth.

(White and Martin p. 763.)

BIBLIOGRAPHY.

Smith, T.—Transactions Pathological Society, London, 1862-3, xiv, 185-187, 1 pl.

Caille, A.—Prolapse of the inverted lower portion of the right ureter through the urethra in a child two weeks old. American Journal Medical Science, Phila., 1888, ns, xcv, 481-486.

Ogle, C.—Transactions Pathological Society, London, 1893-4, xli, 127.

Pousson, A.—L'uretre chez la femme. Atti d xi Congres Medicine Internazzionale, 1894, Roma, 1895, iv, Chirurgie, 456-462.

Prianischikoff. V.—Chrurgie Laitop Moskow, 1895, v, 387-390.

Kablukoff, A. F.—Chirurgie Laitop, 1895, v, 380-387.

Maxon, W. H.—Medical News, New York, 1896, lxviii, 323.

Rolando, S.—Contributo all' ernia dell' uretere. Riforma Medicale, Palmero-Napoli, 1904, xx, 566-568.

Hartwell, J. A.—Ureter in an inguinal hernia. Annals Surgery, Phila., 1904, xxxix, 1907.

Albarran, J.—Prolapsus intra-vesical de l'uretere.

Association France d'Urol. proc-verb., 1904, Paris, 1905, viii, 596-601.

Dalla-Rosa, C.—I.'ernia dell' uretere. Clin. Chirurgie, Milano, 1904, xlii, 512-518.

Carli, A.—Sull-ernia dell' uretere. Gazette Medical Ital., Torino, 1904, lv, 391-401.

Rochet.—Des pjrolapses de l'extremite inferieure de l'ureteres dans la vessie (ureteroceles vesicaux). Lyon Medical, 1905, cv, 202-207.

Geipel & Wollenberg.—Archiv. f. Kinderheilkunde, Stuttgart, 1904, xl, 57-67.

Albarran, J.—Association francaise d'Urologie, proc-verb. 1904, Paris, 1905, viii, 596-601.

Rochet.—Bulletin Societe de Chirurgie de Lyon, 1905, viii, 210-215.

Carli, A.—Klinischer Beitrag, Archiv. f. Klinische Chirurgie, Berlin, 1905, lxxvi, 1078-1099.

Chapter VIII.

OCCLUSION.

1756-1905.

Occlusion of the ureter may be due to new growth within the ureteral wall, polypus, or stone, or pressure from new growth in the adjacent tissues. The obstruction may be at any point from the entrance to the exit of the ureteral tract, and may be periodic or permanent, circular or linear, partial or complete. It may also be due to injury from without or within, such as that which may be caused by blows, surgical operations or the passage of a renal calculus. Floating kidney may cause the ureter to become obstructed at a right angle or twisted upon itself for an indefinite length of time.

Allan, in 1837, reported a case of obstructed ureter with ulceration of the kidney and abscess, male aged 39 years. Post-mortem examination showed peritoneum natural, except on the left kidney and lumbar muscles where it was of a dark color. This kidney which was enlarged to twice its natural size, adhered strongly to the surrounding parts, its tubular part was in a great degree destroyed or converted into little cells having a common communication with the pelvis of this organ and opening, besides by ulceration in the cortical substance at two points into a sac capable of containing a pint, occupying the cellular mem-

brane in the lumbar region. The mucous lining of the kidney was thickened by inflammation and the commencement of the ureter similarly changed in structure and completely closed at this point by coagulable lymph while in the remainder of its course it was contracted but pervious. Right kidney ordinary size, its ureter natural.

Haviland, in 1858, before the Pathological Society of London, presented a specimen of kidney from a lad 19 years of age with obliteration of a ureter, abcess-like dilatation of the calyces of the kidney. The left kidney was found to have lost all its original structure and to be converted into a number of sacs, containing a pus-like fluid, each cavity being lined with a distinct membrane which, when separated, preserved the form of the abscess. These cavities seemed to have had no outlet. The ureter was atrophied and impervious and with the vessels was surrounded by a great quantity of fat. The right kidney was hypertrophied and pale, having a cavity at one of its extremities which contained pus. Its ureter was considerably enlarged and imbedded in fat which also contained a great number of indurated lymphatic glands.

Ewart, in 1878, reported a case of inflammatory stricture of the left ureter which was presumably the starting-point of a chain of unusual symptoms ending in death, the patient a male aged 23 years. Operation: Incision was made into the inflamed tissue but serum only was obtained, died soon after operation. Necropsy: Both kidneys were much

enlarged and very pale from tubal nephritis and presented a few dark blotches and punctiform ecchymoses. The left ureter in its upper part was much swollen and of angry red color. A stricture sufficiently tight to render the escape of fluid impossible was found four inches from the kidney. Below this point, the ureter was normal; above the stricture its lining membrane was intensely inflamed as well as the pelvis, and irregularly ulcerated. The calibre was slightly enlarged and the channel was filled with a dark sanious fluid.

West, in 1881, reported a case of a male aged 74. Obliteration of left ureter by omentum adherent to brim of pelvis with subsequent atrophy of left kidney and complementary hypertrophy of the right. The left ureter passed across to the brim of the pelvis in the midst of the adhesion of the omentum and had been obliterated by pressure here. For four inches above this point it was dilated into a fusiform swelling about one inch in diameter. It felt doughy and on section proved to contain cheesy substance. Above this dilatation to the pelvis of the kidney, it was completely obliterated, being reduced to a fibrous cord.

Barker, in 1882, reported a pathological specimen of a male, aged 55 years, a case of persistently recurring spasm of the bladder, resulting in thickening of its walls, dilatation of the ureters and hydronephrosis. Death from uraemia—Kidneys both are enlarged, the fibrous capsule adherent to the surface of the organs. The cortical substance presents a grayish, nearly uniform appearance with little

trace of the normal markings. The pyramids are in great part encroached upon by the dilated calyces. No abscesses are present in the kidneys. The pelvis and calyces of each kidney are greatly dilated and contain turbid ammoniacal urine. The ureters, their calibre equals nearly that of the small intestine. The walls of the ureters are thickened. No obstruction to the passage of urine exists either in the pelves of the kidneys or in the ureters.

Livingston, in 1883, presented a specimen before the New York Pathological Society from a child, of double hydronephrosis due to abnormal bending of the ureters, suppurative disease of the knee-joint, abscess of the liver. Kidneys both were removed before they were examined. The right one was opened and the pelvis found to be considerably dilated with atrophy of the pyramids, only the cortex remaining. The left was in the same condition. The pelvis of both kidneys contained a small quantity of urine. No renal calculi could be found. The part of the ureters that had been left in the body was normal size and entered the bladder naturally and the bladder was normal as well as the urethra. The cause if the hydronephrosis seemed to be the bending of the ureters twice on themselves. On the left side there was also constriction at the second curve. Bell in 1883 reported a case of a male aged 49 years of Occlusion of both ureters. Death by syncope. Both kidneys were enlarged to about double their normal size, congested and friable. There was a calculus of the size of a peach stone in the in-

fundibulum of the right kidney, also two or three quite small calculi (scarcely as large as peas) in other parts of the kidneys. I suppose about 1½ ounces of urine escaped on section of the left kidney; rather less than 1 ounce from the right; the ureters were blocked. On the right side a calculus was impacted about an inch above the bladder whilst in the left ureter a less firmly impacted calculus had less than half an inch to travel and seemed as if it might have escaped into the bladder within another day if only that fatal syncope had been avoided.

Sansbury, in 1885, reported a case of valvular obstruction of ureter; pyeonophrosis in a female aged 34 years. Necropsy: Right kidney granular and contracted with thickened adherent capsule and thinned cortex; in the cortex, advanced fatty changes. The ureter of the kidney was perfectly patent. Left kidney in a condition of complete pyonephrosis being converted into a fibrous bag divided by septa into a series of compartments. No trace of true kidney substance anywhere visible to the naked eye. Filling the compartments a soft white material like thick white paint. The ureter in its upper two-thirds still patent but its calibre much diminished. Tracing the ureter upwards to just where it entered the pelvis of the kidney, it swelled out rather suddenly, the appearance being just such as would result from an injection of the pelvis of the kidney, supposing the ureter blocked at its mouth. On slitting up the ureter, two small valve-like flaps were found

guarding the entrance. The two were on the same level. One exactly resembled a semi-lunar valve, the other, cut through in the opening of the ureter, could not be so clearly made out. Between them these two valves effectually closed the pelvic outlet, preventing any escape from the kidney. The fact of the complete blockade of these valves is established by comparing the condition of the mucous membrane of the ureter above and below the valves. Immediately above the valves, the mucous membrane presents the rough, crinkled surface which is found lining everywhere the renal sac. Immediately below, the mucous surface is quite smooth. In the lower third of the ureter a lumen could not be discovered nor could the opening of the left ureter into the bladder be found. Accordingly, the calibre of the ureter towards its lower end must have been either absent or very minute. But it must be observed that this latter change in the ureter was a potential, not an actual cause of obstruction. The bladder was somewhat contracted. The case presents many points of interest. In the first place, the renal inadequacy represented by the total destruction of one kidney and the disablement of the other, is sufficient explanation of the symptoms present. They were in the end undoubtedly uraemic. As to the cause of this inadequacy we may take note of the early occurrence and well advanced stage of the interstitial nephritis present in the right kidney (the patient 34 years of age). In the left kidney we may take note of a very unusual form of obstruc-

tion of the ureter. In some of the general text-books on medicine and pathology, I find valvular folds of the mucous membrane given as a cause of hydronephrosis, but in the more special treatises on this subject, I have not come across the record of such cases—certainly of cases parallel to the present one, with the exception of a case recorded by George Johnson, but there the obstruction though similar was in the urethra. Then as to the light in which one is to regard the obstruction here present, the question arises: Is it congenital or acquired? The narrowing of the calibre of the left ureter if not its actual obliteration in the lower third of its course may have been sequential to the blockade higher up or it may itself have a developmental error and then would be an argument in favor of the congenital nature of the valvular obstruction higher up; but the difficulty in the way of this interpretation exists in the precise nature of the impediment, for though indeed valvular obstruction is given as a not infrequent congenital cause of hydronephrosis the kind of valvular obstruction meant is, so far as I can discover an oblique entry of the ureter into the pelvis and not the presence of so definite a structure as that which we have here. It is precisely this definiteness of structure which to me appears to constitute the difficulty of the case; for the error of development, if it be one, is not an error either by excessive or by defective development, nor will it fall in with Forster's third subdivision of malformation by aberrant development, for as it stands, the

valve is almost as much of a new formation as a focus of new growth, but I would ask, must we regard this definite structure to be congenital or acquired as having always been as definite as it now is? It seems to me that a little redundancy of mucous membrane at the mouth of the ureter with some looseness of the subjacent connective tissue permitting of the mucosa being thrown into folds, and overlapping the mouth of the ureter, that such together with the distending force of an accumulating urine would yield the necessary data for the production of such a pocket as we have here. We are familiar throughout the body with folds of the lining membrane of the several hollow tubes. In the arteries, in the veins, in the lymphatics, in the alimentary tract, in the gall-bladder, we meet with them. All we require in all such cases is that the folds should be of sufficient size to form transverse obstructions; they will then, provided a distending force be present, take the shape of pockets. Perhaps comparative anatomy or the study of the development of valves in man would throw some light on this point.

Hadden, in 1885, reported on the specimen of obstruction of ureter by a gumma taken from a man aged 55 who died of strangulated hernia; the right ureter is dilated more than twice its normal size down to a point four and one-half inches from its entrance into the bladder. Below this point the ureter is very small and its lower end just admits the passage of an ordinary probe. The obstructing mass involves the bifurcation of the common iliac ar-

tery and both external and internal iliac arteries while the accompanying veins are tortuous and puckered from the contraction of the inflammatory tissue which surrounds them. The right kidney was entirely cystic; there were gummata in the liver and spleen.

White, in 1887, reported on the specimen of great dilatation of one ureter and pelvis of kidney secondary to urethral stricture; in a man about 40. Left ureter was dilated right down to the bladder to such a size that it would admit the middle finger. No cause for this dilatation was noticeable in the wall of the bladder. The pelvis of the left kidney was much dilated and the greater part of the pyramids had disappeared, constituting an early hydronephrosis.

Blake, in 1887, reported a case of abscess of the kidney from obstruction of a ureter in a man aged 35 years. Necropsy showed obstruction of left ureter by a calculus leading to dilatation of ureter above and pelvis of kidney and calyces with atrophy of kidney, suppurative process in pelvis of kidney, necrosis of mucosa of calyces of kidney, leading to perforation of kidney and discharge of pus into perinephritis tissue, perinephritic abscess extension upwards to diaphragm, perforation of diaphragm, gangrenous pleurisy.

Sowers, in 1888, reported a case of urethritis acute cystitis, obstruction of the ureter, hydronephrosis, ulceration through the peritoneum, diaphragm pleura and lung-tissue and discharge of fluid through bronchi; recovery.

Watson, in 1891, reports on inflammatory stricture of the ureters and reports two cases of his own: Case 1. Autopsy showed right kidney transformed into a big hole, a single sac lined with pyogenic membrane, all the cortical substance of the kidney with the pyramids having been evidently destroyed some time previous by the chronic suppurative process. In the course of that ureter, one inch below its exit from the pelvis of the kidney was found a dense deposit of connective tissue originating probably from the chronic inflammatory process. The ureter was so narrowed at this point that it barely admitted a fine probe. The left kidney measured about 14 cc. in length and was the seat of an extensive hydronephrosis, the cortex being thinned and the organ converted into a series of large compartments. The ureter was widely dilated down to within an inch and one-half of the bladder. At this point was found a smaller deposit of connective tissue than that found in the right ureter, owing to which the calibre of the ureter at that point was similarly narrowed. In this case there was a doubtful history of the passage of a renal calculus about 8 months previous to death. Case 2; the mouths of the ureters were patulous and wide and the mucous membrane around them was swollen and edematous. At a point about 2 inches above the bladder the left ureter was obliterated by the dense deposit of connective tissue which extended for about 1¼ inches in length. The mass occupied all the tissues of the ureter from the mucous membrane out-

ward and constituted a true inflammatory stricture. Above this point the ureter was widely dilated and inflamed. The right ureter was widely dilated from the bladder to within ½ inch of the kidney; at this point it was bent upon itself and was occupied for a distance of about ¾ inches by a mass of connective tissue similar to that described as situated in left ureter; the calibre of the ureter being narrowed at this point so as to only admit of the passage of a large steel knitting needle. In addition the following cases are reported by Dr. Watson: Galliard in 1880—Left kidney seat of an extensive hydro-nephrosis due to the presence of an inflammatory stricture one and one-half cm. long in the course of the ureter just below its exit from the pelvis of the kidney. There was an extensive formation of connective tissue at the seat of the stricture "Progres Medical 1880 Vol. viii; Ayroles Societe Anatomique Vol. lix." Autopsy showed obliteration of both ureters by the formation of a mass of connective tissue resulting in stricture and occlusion. St. George Hospital Reports Vol. X 1879—Male, aged 22. autopsy—Stricture of left ureter 4 inches below its exit from th e kidney; the structure was evidently not of ordinary formation, it was due to the deposition of connective tissue, the result of chronic inflammation above it; the mucous membrane of the ureter was thickened and swollen. Both kidneys were enlarged and the seat of a diffuse nephritis.

Nash, in 1892, writes on stricture of the ureters following gonorrhea, a cause of hydronophrosis, says "amongst the numerous causes which give rise to hydronephrosis, I am not aware that gonorrheal stricture of the ureters have been mentioned. In ureteral strictures in this case I believe to have been produced by gonorrheal inflammation. Against their being congenial are the facts (1) that the dilatation of the renal pelves and calyces was not so advanced as would have been expected if the obstruction had lasted 44 years. (2) Congenital strictures are usually found at one or other extremity of the ureter and as far as I know are never multiple.

BIBLIOGRAPHY.

Huxham, J.—Philosophical Transactions 1743-50 London, 1756 x, 1007-1009.

Brown, C.—Medical and Physical Journal London, 1799, i, 449.

Boutteaux. Rec. de Memoires de Medecine Militaire, Paris, 1818, v, 221-237.

Sasie.—Bulletin Societe Anatomie, Paris, 1831, vi, 51.

Allan, R.—Edinburgh Medical and Surgical Journal, 1837, xlviii, 51-55.

Haviland, A.—Transactions Pathological Society London, 1858-9, x, 209.

Gauchet, A.—Union Medicale, Paris, 1859, 2s, iv, 51-57.

Tournie.—Union Medicale Paris, 1860, 2s, v. 378-381.

Ackerman, T.—Deutsches Archiv. f. Klinische Medicin, Leipzig, 1866, i, 456-460.

Englisch, J.—Mittheilungen d. Arztlichen Vereins in Wien, 1874-5, iii, 73-75.

Clark, J.—Medical and Philosophical Commentaries. London, 1779, vi, 204-208.

Regnard, P.—Comptes Rendus Societe de Biologie, 1877, Paris, 1879, 6s iv, 156-158.

Triglia, P.—Sperimentale Firenze, 1879, xliii, 291-308.

Ewart, W.—St. George's Hospital Report 1879, London 1880, x, 330.

West, S.—Transactions Pathological Society, London, 1881-1882, xxxiii, 203.

Otis. F. N.—Philadelphia Medical Times, 1881-2, xii, 490-503.

Straus & Germont.—Comptes Rendus Societe de Biologie. Paris, 1882 7s, iv, 43-47.

Livingston, B.—Medical Record, New York, 1883, xxiii 330.

Bell, J. V.—Lancet, London, 1883, ii, 1040.

Gray, H.—Transactions Pathological Society, London, 1885-6, vii, 262.

Hadden, W. B.—Transaction Pathological Society, London, 1885-6, xxxvii, 301.

Sainsbury, H.—Transactions Pathological Society, London, 1885-6, xxxvii, 296-299.

Pitt, G. N.—Transactions Pathological Society, London, 1886-7, xxxviii, 168.

Fenwick, E. H.—Proceedings Medical Society, London, 1887, i, 625.

Caryophillis, G.—Bulletin Societe Anatomie, Paris, 1887, lxii, 755.

Blake, F. G.—Boston Medical and Surgical Journal, 1887, cxvi, 549.

Dandois.—Revue Medecine Louvain, 1888, vii, 157-165.

Sewers, Z. T.—Medical Record, N. Y., 1888, xxiv, 287-289.

Holste, A.—Ueber Harnleiterunterbindung. Gottingen, 1888.

Crooke, G. F.—Transactions Pathological Society, London, 1888-9, xl, 161.

Coe, H. C.—Annals Gynecologie and Pediatrics, Phila., 1890-91, iv, 661-667.

Watson, F. S.—Journal Cutaneous and Genito-Urinary Diseases, New York, 1891, ix, 407-412.

Farr, W. W.—American Journal Medical Sciences, Phila., 1892. ciii, 277-286.

Nash, W. G.—British Medical Journal, London, 1892, i, 963.

Mynter, H.—Annals of Surgery, Phila., 1893, xviii, 658-661.

Hollander, E.—Berliner Klinische Wochenschrift, 1897, xxxiv, 740-745.

Harvie, J. B.—Annals Gynecology and Pediatry, Boston, 1897-8, xi. 430-434.

Cornil, V. et Carnot.—Bulletin Academie de Medecine, Paris, 1898, 3s, xxxix, 121-123.

Israel, J.—Berliner Klinische Wochenschrift, 1899, xxxvi, 31-39.

Robinson, B.—American Journal of Dermatology and Genito-Urinary Diseases, 1904, May, 101-112.

Welz, R.—Ueber Atresie der Ureteren, Muenchen, 1903. C. Wolf & Sohn, 44 p.

Robinson, B.—Anatomischer Anzeiger, Jena, 1903-4, xxiv, 482-485.

Nicolaysen, J.—Sur 4 cas de retention renale par retrecissement de l'uretere Res. 1336. Norsk Magazine f. Laegevidensk, Kristiana, 1903, 5 R, i, 1297-1323.

Robinson, B.—American Journal Dermatology and Genito-Urinary Diseases, St. Louis, 1904, viii, 106-111.

Robinson, B.—Regular Medical Visitor, St. Louis, 1904. xv, 146-148.

Metcalf, W. F.—Detroit Medical Journal, 1905-6, v, 92.

Monsarrat, K. W.—Wiener Medicinische Presse, 1905, xlvi, 1593-1599.

Monsarrat, K. W.—British Medical Journal, London, 1905, i, 1323-1325.

Drew D.—Transactions Clinical Society, London. 1905. xxxviii, 129-13, 133.

Monsarrat, K. W.—(Abstract) Liverpool Medico-Chirurgical Journal, 1905, xxxv, 128.

Martin.—University Durham College Medical Gazette Newcastle, 1905-6, vi, 63-65.

Gibbon, J. H.—American Medicine, Phila., 1906, ns, i, 76-78.

Metcalf, W. F.—Detroit Medical Journal, 1905-6. v, 92.

Extraperitoneal Implantation.

Lichtenauer, K.—Monatschrift f. Geburtshuelfe u. Gynakologie. Berlin, 1905, xxii, 382-388.

Rissman, P.—Ibid, 1905, xxii, 389-396.

Sampson, J. A.—Operations on the lower ends of the ureters by the inguinal extra-peritoneal route under local anaesthesia (cocaine). Annals of Surgery. Phila., 1905, xli, 216-241, 6, ch.

Gallant, A. E.—Subcutaneous pelvioureteral lumbar implantation in lieu of ureterectomy after nephrectomy. American Medicine. Phila., 1906. xi, 65-67.

Newland, H. S.—The extra-peritoneal implantation of the ureters into the rectum in ectopia vesicae. Australasian Medical Gazette. Sydney, 1906, xxv, 42. Also, British Medical Journal. London, 1906, i, 964-967.

CHAPTER IX.

CALCULUS.

1820-1905.

Calculus—Concretions formed primarily in the ureter are very rare; when they do occur, they are composed of phosphatic salts deposited above a structure or upon an ulcer or a foreign body within the ureter. Renal calculi which have descended and become impacted in the ureter, because of their volume or of their shape and roughness are much more common. They are composed of uric acid of the urates of calcium oxalate, or of the phosphates. One stone may be impacted alone or the ureter may be filled with a large number of them. They may be several inches in length and large enough in diameter to completely fill the ureteral canal They are usually ovoid in shape but may be spherical or irregular. The impaction may take place at any point, but usually occurs in the upper end of the ureter within an inch or two of the kidney at about the level of the brim of the true pelvis or at the lower end of the ureter just before it enters the vesical wall.

Wilkes, in 1855, reported a case of obstruction of urine from a calculus lodged in the ureters in a male, aged thirty-eight; necropsy showed both kidneys much enlarged, especially the left. On making sections they were found to be invested by a thick adipose capsule firm and dense in structure, but easily sep-

arated from the kidney; in some parts it was nearly an inch in thickness The left kidney and its capsule weighed eighteen ounces. The pelvis of this kidney was distended with urine and very much enlarged. The mouth of the ureter was blocked by a conical calculus more than an inch in length, moulded to the shape of the opening of the ureter. The infundibula contained some sabulous matter and two small calculi about the size of peas. Both kidneys were pale in structure. Left ureter natural in size and free from obstruction in the rest of its course. The right kidney was natural in size, the pelvis and ureter to about the middle of its course were very much dilated and distended with urine; at this point two calculi were firmly impacted in it about an inch distance from each other, one oblong and the other round. The ureter below was pervious and admitted a common-sized probe while above the little finger would pass readily into it. There was a good deal of sand in the infundibula. Bladder, empty, but healthy in structure.

Beith, in 1851, reported a case of diseased bladder with calculi impacted in the ureter in a male aged 53 years. Necropsy:—Right kidney was converted into a large cyst four or five times the size of the healthy organ. The inner surface of both the cyst and ureter was rendered uneven and irregular by numerous bands passing around portions of the walls and constricting the cavities at these points. In the ureter this occurred to such an extent that it might be said to be divided into several com-

partments, one above the other. In the compartments three calculi were found imbedded. the largest of which occupied its superior third and was about three inches long and three-quarters of an inch in diameter.

Jones, in 1852, reported a case of renal calculi, one at the beginning and the other at the ending of the ureters in a female aet. 20 years. Necropsy:—The right pelvis contained one or two loose portions of calculus and the commencement of the ureter a calculus about the size of the last phalanx of the little finger. It had grown down the ureter so that it was turned out with difficulty. Below this, the ureter was not dilated. On the left side the ureter was dilated. The lower extremity was occupied by two calculi of the size of hazel nuts consisting of a thick deposit of oxalate of lime externally with a uric acid nucleus. The bladder was healtny.

Goodfellow, in 1862, reported a case of left kidney extensively sacculated and containing numerous minute calculi, obstruction of ureter by three calculi, right kidney condensed in structure and studded with minute calculi. in a female aet. 6: Post-mortem showed right kidney, small, pale, condensed in structure and studded with minute calculi varying in size from that of a medium-sized pin-head downwards.

These calculi were composed of phosphate and oxalate of lime. Left kidney externally lobulated. The structure was completely atrophied and replaced by numerous sacculi varying in size from that of a small hazel-nut

to that of a large pea. In these sacculi there were numerous minute calculi resembling in form and composition those found in the right kidney. The calyces and pelvis were considerably dilated, also the ureter. At the lower end of this canal there were three oval calculi about the size and somewhat the form of a small horsebean. These consisted for the most part of the phosphate and oxalate of lime. The coats of the bladder were much thickened and the lining membrane injected.

Cutter, in 1864, reported a case of nephritic calculus lodged in the right ureter of a female aet., 28 years. Autopsy showed right kidney twice the size of the left; the right ureter was enlarged, twisted and distended; at the kidney it was nearly three quarters of an inch in diameter and tapered down to the normal size at the bladder. About an inch from the bladder a calculus was found impacted in the ureter.

Morris in 1874 reports three cases on the pasage of renal calculi down the ureters. He says few writers on practical medicine allude to the passage of a calculus from the kidney down the ureters to the bladder, and those who do notice it give only a meager description of the symptoms. The calculi which pass with such formidable severity down the ureters are calcareous deposits from the urine within the pelvis of the kidney and occasionally assume a size as to be unable to leave that cavity, producing the most agonizing and disastrous results.

Lloyd, in 1875, reports a case of calculus in the ureter in a male, aet., 27 years. Post-mor-

tem showed the substance of the left kidney had almost disappeared, the pelvis being dilated into a sacculated pouch capable of holding 8 or 10 ounces and containing pus, blood and urine. The ureter was much dilated as far as the brim of the pelvis where there was a constriction, below which was lodged a large crooked calculus of irregularly fusiform shape largest at its lower end, which was rounded and curved to the shape of the pelvic wall and lay in a cul-de-sac formed of the dilated ureter pushed downwards just before its opening into the bladder; this latter orifice was of normal size, the upper end of the calculus tapered almost to a point, which was hooked as to lie over the brim of the pelvis, thus fixing against the bone the whole intra-pelvic portion of the ureter. The calculus was composed of lithic acid with a powerful superficial layer of triple phosphate at its upper end.

The course of the disease appears to have been this: A renal calculus descending through the orifice into the bladder was arrested at this point. As it increased in bulk it also by a process resembling the growth of a stalagmite, pushed upwards by a tapering end towards the kidney. During this growth, by its obstruction of the duct, it dilated and eventually destroyed the kidney at its own side and as it grew in length it gradually interfered with the movements of the bladder, finally tying it down by the ureter to the walls of the pelvis, thus mechanically preventing its dilatation. Hence followed cystitis with the symptoms of

vesical calculus and in due course consequent degeneration of the right kidney.

Newman, in 1876, reported a case of suppression of urine lasting five days. Death; symmetrical blocking of both ureters with calculi in a male, aet., 73 years. Post-mortem showed the right kidney represented by a mere capsule of the size of a small hen's egg, and in this there was hardly a trace of kidney structure to be seen. At the point of emergence of the ureter was found a calculus, an aggregated mass of lithic acid coated with phosphates firmly adherent to the lining membrane. The left kidney was normal in size and healthy in appearance. The pelvis contained a drachm of urine and several small calculi were fixed in the substance of the kidney. At the same point as on the other side was a calculus similar in structure and smaller in size, firmly wedged into the ureter.

Longstreth, in 1880, reported a case of calculus of right, and double ureter of left kidney in a female aet., 49 years. Autopsy showed right kidney surrounded by an immense quantity of fatty tissue. This organ was removed in connection with the aorta, the ureter and the urinary bladder. The ureter likewise was surrounded by a collection of fat measuring over an inch in diameter. On dissecting the fat from around the kidney, marked evidence of inflammation was found and the same condition was noticed around the ureter. On section of the kidney substance, the organ was found almost completely destroyed. Its pelvis was greatly dilated and contained a large ir-

regular calculus with a very rough surface. At the upper part of the organ was an abscess containing very thick purulent matter; and one or two small fragments of calculous material at the lower part of the cavity of the pelvis reached nearly to the surface of the organ. The interior of the pelvis showed very marked alterations from inflammatory changes and was covered with thick creamy pus, shreds of tissue and small calculous masses. Walls of the ureter were greatly thickened and its mucous surface very uneven.

Pick, in 1886, reported a case of impaction of stone in one ureter, with atrophy of the kidney on the other side, in a male aged 45 years. Necropsy showed left kidney twice its natural size blocked the ureter. The ureter itself, contained six or seven small calculi studded throughout its substance. One large calculus was contained in the pelvis. The bladder contained one small stone.

Goodlee, in 1887, reported a case of obstruction of one ureter by a calculus, accompanied by complete suppression of urine in a male. Post-mortem showed right ureter much distended throughout and half way down it was obstructed by a stone 1-25 inches long and 5 inches in diameter, which had evidently occupied this position for a long time, but it is remarkable that the distension, though not so great, was very palpable below the obstruction. Left ureter was normal and patent.

Mott, in 1890, reported a case of renal calculus, nephrectomy performed 9 years ago;

impaction of calculus in ureter of the other kidney followed by non-obstructive jaundice and death; in a male, aet. 26 years. Necropsy showed on dissecting out the ureter that a stone could be felt in it about an inch and a half beyond the pelvis. On slitting up the ureter a small uric-acid calculus of an irregular shape measuring 2-3 inches long by 1-3 inches transverse diameter, was found impacted in the ureter an inch and a half from the hilus.

Sutherland and Edington before the Glasgow Pathological Society in 1898 reported a case of calculus in vesical extremity of ureter invaginating wall of bladder;—absence of symptoms: Viewed from within there is a distinct slightly lobulated swelling at the seat of the orifice of the right ureter. Before incising the swelling a structure of a dark bluish color could be seen within and a probe introduced from above encountered a hard body of some size. As displayed by incision the body is of a dark flattened oval calculus measuring 8 mm. in diameter. It has been found to be composed of oxalate of lime; it has prominent, somewhat sharp, projections and is very hard. The sac in which it is contained holds it loosely. The ureter in its courses shows slight dilation and thickening. There was not hydronephrosis. The calculus is practically inside the wall of the bladder and has invaginated the mucous membrane before it in the form of a sac.

Deaver, in 1902, reported a case of con- absence of left kidney, obstruction of eter by stone in a male aet. 65 years.

Post-mortem showed that left kidney was missing, the left ureter being represented only by a fibrous cord extending down through the inguinal ring to the scrotum. A small stone was found blocking the right ureter near the bladder.

BIBLIOGRAPHY.

Scati, P.—Gorizia, 1782.

Baylies, W.—Medical Communications Massachusetts Medical Society, Boston, 1808, i, 90-93.

Rouchoux.—Bulletin Facultie de Medicine de Paris, 1820, vii, 258-261.

Fontenelle, E. J.—Archives Generales de Medicine, Paris, 1823, ii, 577-581.

Lherminier.—Clinique d'hopitaux, Paris, 1827-8, ii, 209.

Barth.—Bulletin Societe Anatomie, Paris, 1835. 3s, i (x) 68.

Wilkes, J.—London Medical and Surgical Journal, 1835, vi, 822.

Molloy.—Bulletin Societe Anatomie, Paris, 1839-40, xiv, 345-348.

Lagout.—Bulletin Societe Anatomie, Paris, 1843, xviii, 202.

Lassaigne.—Bulletin Societe de Medicine, Paris, 1844-5, x, 244-249.

Law.—Proceedings Pathological Society, Dublin, 1845, l, 351.

Dexter, W. P.—Boston Medical and Surgical Journal, 1849, xl, 219.

Bernard, M. C.—Dublin Medical Press, 1848, xx, 195. ix-10.

Ripley, B. H.—Charleston Medical Journal, 1850, v, 151-157.

Veith.—Transactions Pathological Society, London, 1850-51, iii, 117.

Bauchet.—Bulletin Societe Anatomie, Paris, 1851, xxvi, 89.

Jones, B.—Transactions Pathological Society, London, 1852-3, iv, 192.

M'Dowell.—Dublin Hospital Gazette, 1855, ns i, 358.

Aubree.—Bulletin Societe Anatomie, Paris, 1857, xxxii, 213.

Goodfellow.—Transactions Pathological Society, London, 1862, xiii, 158-60, plate 1.
Cutter, E.—Boston Medical and Surgical Journal, 1864, lxx, 76.
Serra, E. C.—Siglo Medical, Madrid, 1866, xiii, 801-804.
Monckton, S.—British Medical Journal, London, 1874, i, 448.
Odin.—Memoires et Comptes Rendus, Societe d sc Medicine de Lyon (1873) 1874, xiii, pt ii, 225-228.
Ory.—Bulletin Societe Anatomie, Paris, 1875, xlviii, 313.
Anodru.—Bulletin Societe Anatomie, Paris, 1875, 3s, i, 298.
i 298.
Lloyd, W. H.—Lancet, London, 1875, i, 404.
McG.—Osservatore Torino, 1875, xi, 101-103.
Newman, W.—British Medical Journal, London, 1876, i, 70.
Philipson, G. H.—Report Proceedings Northumberland & Durham Medical Society Newcastle-Upon-Tyne, 1873-9, 27-29.
Longstreth, M.—Transactions Pathological Society, Phila., 1880, ix, 60-62.
Vigot.—Bulletin Societe Anatomie de Nantes, 1882, Paris, 1884, vi, 17.
Pick.—Lancet, London, 1886, i, 976.
Tourneur, C.—Paris, 1886.
Monier.—Marseilles Medicale, 1886, xxiii, 43-47.
Godlee, R. J.—Medico-Chirurgical Transactions, London, 1887, i, 237-251.
Halle, A. J. M. N.—Ureterites et Pyelites, Paris, 1887.
Gargan, M. G. H.—Calcules des ureters (Bordeaux) 1887.
Byford, H. T.—American Journal Obstetrics, New York, 1889, xxii, 962.
d'Ajutolo, G.—Memoires Academie d Sc. d Ist. di Bologna, 1888-9, 4s x, 209-215.
Audain.—Bulletin Societe Anatomie Paris, 1889, lxiv, 24-28.
Mott, F. W.—Lancet, London, 1890, ii, 166.
Legueu, F.—Paris, 1891.
Poyntz, J. W. W.—Indian Medical Record, Calcutta, 1891, ii, 39.
Cabot, A. T.—Transactions Medical Society, N. Y., (Phila. 1892) 95-103.

James, A.—Edinburgh Hospital Reports, 1894, ii, 377-381.
Pollosson, M.—Gazette d'Hopitaux de Toulouse, 1895, ix, 347.
Albarran.—Annales d Maladies Organes Genitaux-Urinaires, Paris, 1895, xiii, 193-216.
Adams, N. H.—Chicago Clinical Review, 1896-7, vi, 422-425.
Sutherland, L. R.—Glasgow Medical Journal, 1898, xlix, 131.
Perkins, J. W.—Annals Surgery Phila., 1898, xvii, 643-646.
Gnoinik.—Otchot o diaeyatelin Khirurgie Klinik v Moskow (1896-8) 1899, 119-126.
Graham, D. W.—Chicago Medical Journal and Examiner, 1876, xxxiii, 908-910.
Cunningham, J. A.—Lancet, London, 1900, i, 1585-1, 1586 1 fig.
Kreissl, F.—Some remarks in reply to Dr. H. A. Kelley's Article on Ureteral Calculus, Journal American Medical Association, 1900, xxxiv, 889-890, 2 fig.
Leonard, C. H. L.—Annals Surgery, Phila., 1900, xxxi, 163-179, 2 figures.
Guyon.—Bulletin Medicale, Paris, 1900, xiv, 94.
Routier.—Bulletin et Memoires Societe de Chirurgia, Paris, 1900, xxvi 39.
Pasteau, O.—Association Francaise d'Urologie. Paris, 1899, Proc-verb. 1900, 233-244.
Schmidt, L. E.—Monatsblatt f. Urologie, Berlin 1901, vi, 427-431, 3 figs.
Deaver, J. B.—Congenital absence of left kidney Obstruction of right ureter by stone. Annals Surgery, Phila. 1902, xxxvi, 94.
Legueu, F.—Bulletin et Memoires Societe de Chirurgia, Paris, 1902, xxviii, 1132.
Longstreth, M.—Philadelphia Medical Times, 1879, ix, 437.
Perkins, I. B.—Denver Medical Times, 1902, xxi, 481-483.
Addy, G. A. B.—Maratime Medical News, Halifax, 1903, xv, 374; 376.
Young, H. H.—Maryland Medical Journal, 1903, lxvi, 99-105.
Fiori, P.—Clinic Moderne, Pisa, 1903, ix, 54-65.
Mazzoni, G.—Sopra alcuni casi di calcoli ureterici. Bulletin de Soc Lancisiani d osp di Roma, 1903-4, xxiii, fasc. 1 part 2, 114-126.

Crawford, J. P.—Operative technic in stone in the ureter. American Medicine, Phila., 1904, viii, 971.

Robinson, B.—Remarks on diagnosis of Ureteral Calculus. Illinois Medical Bulletin, Chicago, 1904-5, v, 211-218.

Fowler, H. A.—The iliac extra-peritoneal operation for stone in the lower ureter in the male. Annals Surgery, Phila. 1904, xl, 943-961.

Brewer, G. E.—Stone in the pelvic portion of the ureter. Annals Surgery, Phila., 1905, xli, 132-134.

Fowler, H. A.—The diagnosis of renal and ureteral calculi. Medical Record, N. Y., 1905, lxvii, 171-174.

Horesco, P.—Calcule vesical-ureteral suppuree avec distension hydro-nephrose droite taille hypogastrique nephroureterectomie totale; guerison. Bulletin et Memoires Societe de Chirurgie, Paris, Paris, 1905, ns, xxi, 158-160.

Lillienthal, H.—Calculus in ureter; perinephritic abscess. Annals Surgery, Phila., 1905, xli, 764-766.

Desnos.—Calculus de l'uretere. Association France d'Urologie, Proc-verb., 1904, Paris, 1905, viii, 458-463.

Cunningham, J. H., Jr.—The cases of renal and ureteral calculi at the Boston City Hospital. Boston Medical and Surgical Journal, 1905, clii, 655-657.

Cabot, A. T.—Observations on ureteral calculi. Boston Medical and Surgical Journal, 1905, clii, 653-655.

Cathelin, F.—Calcul de l'uretere pelvien. Bulletin et Memoires Societe Anatomic, Paris, 1905, lxxx, 250-256.

Millet, M. C.—A case of ureteral calculus. Northwest Lancet, Minneapolis, 1905, xxv, 93.

Durrieux, A.—Association france d'Urologie proc-verb., 1905, Paris, 1906, 329-342.

Guyon.—Revue Generale de Clinique et Therapeutique, Paris, 1906, xx, 22.

Legueur, F.—Bulletin et Memoires Societie de Chirurgie, Paris, 1906, xxxii, 504.

Cospedal.—Revue de Medicine y chirurgie Pract.. Madrid, 1906, lxxi, 104.

Rousse, L.—Bulletin Societie de Medicine de Gand, 1906, lxxiii, 15-17.

Campbell, R. P.—Montreal Medical Journal, 1906, xxxv, 266-268.

Legueur.—Paris Medical Journal, Paris, 1906, i, 127.

Barling.—British Medical Journal, London, 1903, ii, 1532.
Imbert, L.—Annals Societie Med-Chir., Liege, 1905, xliv, 324.
Hubbard, J. C.—Medical & Surgical Reports Boston City Hospital, 1905, 156-158.
Eaton, G. L.—Nephro-phonotoscope and ureteral calculi California Journal Medicine San. Francisco, 1905, iii, 357.
Simelew, Eugenia.—Policlinic Roma, 1905, xii, sez chir., 205; 270; 285; 343.
Heresco.—Bulletin et Memoires Societie de Chirurgie de Bucarest, 1905-6, viii., 130.
Cantwell, F. V.—American Journal Dermatology and Genito-Urinary Disease, St. Louis, 1905, ix, 334-337.
Skeel, R. E.—Cleveland Medical Journal, 1905, iv, 437-444.
84. Uric Acid Calculus—Its Significance. (Medical Standard. March, 1905).
85. Calcium Oxalate Calculus—Mulberry Calculus. (American Practitioner and News, July, 1905.)
86. Remarks on Ureteral Calculus. (Medical Summary, July, 1904.)
87. Removal of Calculus From the Pelvic Ureter Per Vaginam. (Medical Standard, February, 1904).

CHAPTER X.

CYSTS.

1834-1905.

Cysts of the ureters are infrequent and may contain urine, pus, mucous blood or serum, one or all combined. They may be single or multiple within the lumen or in the ureteral wall and vary in size from a few drops to several ounces. They may be primary or secondary; primary when they originate as a result of defective structure of the ureter not due to outside causes such as diseases of the kidney, bladder or other abdominal viscera; secondary when due to these causes or to obstruction.

Eve, in 1889, before the Pathological Society of London reported on the case of psorosperial cyst of both ureters in a female, aet. 51 years. The specimen was described as follows: Section of a kidney with the ureter which is the seat of psorosperial cysts. Its inner suface is thickly studded with closely grouped rounded cysts the size of millet-seeds and of a yellowish color. They project prominently from the mucous membrane and cease at a point an inch and a half below the pelvis. With the exception of changes, the result of de-composition, the kidney appears healthy. The opposite kidney has two ureters both of which are affected in the same manner as in preceding specimen, but in these some of the cysts appear to have ruptured and have left minute rounded apertures in the mucous membrane.

Clarke, in 1892, reported on a specimen of a case of psorospermial cysts of the left kidney and ureter and of the bladder with hydronephrosis of the left kidney. Left kidney hydronephrotic and the ureter was felt to contain small elastic-feeling bodies which collapsed on pressure. Left kidney was found to contain a group of small cysts at its upper end. In the dilated pelvis of the kidney and in the upper half of the ureter there were numerous cysts of a greenish brown color and being on an average the size of hemp-seed. There was a moderate amount of hydronephrosis. There were numerous small cysts at the neck of the bladder and at the vesical orifices of the ureters there was one subcapsular cyst in the right kidney which in other respects appeared to the naked eye to be normal.

BIBLIOGRAPHY.

Rayer & Bernard.—Aine hydati des renales rendues par l'uretere faits analogues. Gazette d'Hospitaux, Paris, 1834, viii, 605.

Liouville.—Bulletin Societe Anatomie, Paris, 1868, xliii, 149.

Weichselbaum, A.—Bericht d. k. k. Krankenanst. Rudolph-Stiftung in Wien (1887) 1888, 385.

Eve, F. S.—Transactions Pathological Society, London, 1888-9, xl, 444-446.

Targett, J. H.—Cysts of the ureter and pelvis of kidney psorospermial sacs. Transactions Pathological Society, London, 1889-90, xli, 170.

Clarke, J. J.—Transactions Pathological Society, London, 1891-2, xliii, 94-99, 1 pl.

Pisenti, G.—Le formazioni cistische della vessica e dell uretere. Archives per le Societe Medecine, Torino, e Palermo, 1892, xvi, 181-200, 1 pl.

Clarke, J. J.—British Medical Journal, London, 1892, 1, 274.

Pisenti, G.—Ueber die para sitare Natur der ureteritis chronica cystica. Centralblatt f. Allgemeine Pathologie u. Pathologische Anatomie, Jena, 1893, iv, 577-579.

Saricheff, I. D.—Chirurgie, Laitop Moskow, 1895, v, 378-380.

Jacobson.—Bulletin Societe Anatomie, Paris, 1896, lxxi, 294-297.

Barbacci, O.—Sull ureterite cistica. Sperimentale Archiv. di Biologie Firenze, 1903, lvii, 720.

Dionisi, A.—Sulla cistite e ureterite cistica. Sperimentale Archiv. di Biologie Firenze, 1903, lvii, 720.

Cova, E.—La complicanza dell uretrocele vaginale conla calcolosi. Ginecologia Firenza, 1904, i, 740-750.

Recasens.—Ureteroneocestomia. Revue de medecine y chirurgie practiciens Madrid, 1904, lii, 23.

Jun, M. O. R.—Ein seltener Fall von Uretercyste Berlin, 1904, p. 38.

Furnival, F. H.—Cystic dilatation of lower end of ureter. Australian Medical Gazette, Sydney, 1904, xxiii, 394-396.

Robinson, B.—Cysts of the ureter (cystica ureteritis) American Journal Surgery & Gynecology, St. Louis, 1904-5, xviii, 83-86.

Konig, F.—Ueber intermittierende cystische dilatation der vesikalen ureterenden Munchen Medicinische Wochenschrift, 1904, li, 2226-2228.

Pasteau, O.—La dilatation intra-vesicale de l'extremite inferieure de l'uretere Association france d 'Urologie proc-verb, 1904, Paris, 1905, viii,602-613.

Fortescue-Brickdale, J. W.—A note on congenital dilatation of the ureters with hydronephrosis Bristol Medico-Chirurgical Journal, 1905, xxiii, 231-233.

CHAPTER XI.

RUPTURE.

1837-1905.

Rupture of the ureter may be due to trauma, disease or the presence of one or more concretions and there does not seem to be any point in the ureter more susceptible to rupture than another. Concretions are the most common cause, especially so when associated with infection or stricture. The rupture may be linear or circular in character, seldom involving the entire circumference of the ureter.

Stanley, in 1485, reported a case of a female who was knocked down and pushed before the wheel of a cart injuring right hypochondrium, followed by circumscribed swelling right hypochondrium; death. On examination there was a large cyst extending from the diaphragm to the pelvis. There was a passage from the upper part of this cyst to the pelvis of the kidney where a large irregular aperture existed.

Fuller, in 1863, reported a case of great rarity and interest; pyonephrosis from obstruction of the ureter by renal calculi, rupture into the peritoneum and consequent fatal peritonitis. Female aged 21 years: Autopsy—when bowels were moved aside a large ragged hole was seen just beneath the liver from which pus was issuing in abundance. This proved to be in the anterior surface of the right kidney. The opening was about the circumference of a half crown, the edges were thin and vascular, the

kidney itself was enormously enlarged and distended by thick pus into a mere bag. The calyces were all distended and lined with a thin layer of false membrane. The part of the cavity which had burst was a sort of diverticulm, which communicated by a narrow neck with the pelvis. Intermixed with the pus were many small fragment of calculi of a very friable consistence; some of these were lodged in the ureter so that a probe could only be passed through the tube with much difficulty.

Poland, in 1869, reports a case of a female, act. 33, severe contusion of the abdomen during pregnancy, ruptured ureter, abdominal lesions, abortion, death. Post-mortem showed the right ureter was torn quite across just below the pelvis of the kidney so that it ended by a broken end in the middle of the above half-sloughy tissue which middle part was softened down and destroyed.

In remarks on rupture of the ureter Dr. Poland says: The ureter in its anatomical disposition is a long canal leading from the kidney to the bladder, and is so placed as almost to secure it from all external injury. It lies behind the peritoneum along the posterior wall of the abdomen and is protected on all sides, the only parts which are at all vulnerable are its commencement from the kidney called the pelvis and the first part of its course for a few inches. Here it is situated in the loin, and may undergo stretching from inordinate torsion of the body or may be exposed to external violence from severe contusion in this region. Hence in all cases recorded, injury to the

ureter has been found close to the kidney. The ureter may be subject to lesions of several kinds; thus it may be ruptured from severe contusion without lesion of any other important structure, the urine escaping into the cellular tissue behind the peritoneum; the rupture may involve the peritoneum inducing peritonitis: or it may be complicated with lesion of the kidneys and other important structures. The ureter has also been injured by penetrating wounds and again it may become obliterated and induce disease of the kidney.

Holmes, in 1877, reported a case of a male, aet. 13, who was stabbed by accident, wounding the kidney and ureter through the posterior parieties of the abdomen, with prompt recovery of patient.

Bennet, in 1883, reported a case of injury of the kidney and obstruction to the ureter, retention of urine in the loin; says, in recording this case: "I wish to invite attention to the following questions: 1—The possibility of early and rapid dilatation of the pelvis of the kidney: 2—The effects of a rent or laceration of either of these structures. The case was a male, aet. 24 years, having been brutally assaulted, was in a state of collapse, with colicky pains in lower part of abdomen and hypogastrium and of great tenderness best marked in the left flank; there was no external bruising."

1—Injury to the kidney as the evident cause of hematuria (2) the sudden and complete disappearance of the blood from the urine on the fourth day of the injury and this supervening

very quickly on (3) an attack of severe paroxysmal pain in this flank with (4) the dulness and fulness in that region. I concluded that probably the ureter was blocked in some part of its course by a clot and that blood and urine, unable to escape down it, were accumulating in the loin, but whether in the pelvis of the kidney or outside in the perinephritic tissue, I could not determine. I thought, however, that it was probably within the former and determined on the aspirator for its relief, which was done under chloroform." Patient recovered.

Barker, in 1885, reported a case of excision of the kidney for ruptured ureter and urinary abscess in a child aged 3 years and 8 months, who was run over by a hansom cab. Recovery. There was extreme bruising of the left side and the mark of a wheel having passed across as far as the anterior iliac spine. It was concluded to remove the kidney. It consisted in an incision about three inches long immediately below and in the direction of the last rib and commencing below and in the direction of the erector spinae muscle, then division of the layers of muscle and aponeurosis, then clearing the whole surface of the kidney from its surrounding fat with the finger, next transfixion of the pedicle with an aneurysm needle armed with carbolished twisted silk and tying the pedicle in two portions, then in drawing the kidney out of the wound, and a further ligation of the vessels en masse on the proximal side of the first. After this the pedicle was divided with a snip or two of the scissors and slipped back into its place, then suture with

silver stitches and dressing with salicylic wool, as a drain-tube being left in the original drainage opening. There was no marked shock. Child went home seven weeks after the removal of the kidney, well.

The kidney removed proved to be perfectly healthy macroscopically and microscopically, and the pelvis was not dilated. The ureter appeared to be divided just below the seat of rupture.

Page, in 1894, reports a case of ruptured ureter followed by nephrectomy in a child aged 5 years who was knocked down and run over by a light vehicle, the wheel of which was said to have passed over his abdomen: Operation done; no rent or other abnormality of ureter was visible. Child bore operation well. Kidney removed. I ventured to speak of this case as one of ruptured ureter, but inasmuch as the rupture was never seen it is natural that some doubt may be felt as to the correctness of the diagnosis.

Paton, in 1909, reported a case of ruptured ureter or renal pelvis in a male aet. 36 years: Operation, recovery. Dr. Paton says there can be no doubt I think that the injury in this case was either rupture of the ureter or of the renal pelvis. The diagnosis between these two injuries is, except by a discovery of the vertical tear by operation, impossible, but for purpose of treatment this is of slight consequence.

Nahot, A.—Des ruptures de l'uretere, Paris, 1837.
Stanley, E.—Medico-Chirurgical Transactions, London, 1843-4, xxvii,1-11.
Fuller.—Lancet, London, 1863, ii, 723.

Poland, A.—Guy's Hospital Reports, London, 1869, 3s, xiv, 85-98.

Holmes, T.—Medico-Chirurgical Transactions, London, 1876-7, lx, 249-263.

May, B.—British Medical Journal, London, 1883, i, 108-110.

Filet, H.—De la lesion des ureteres dans les hysterectomies et operations analogues. Bulletin Medicine du Nord Lille, 1883, xxii, 359-371.

Barker, A. E.—Lancet, London, 1885, i, 95-99.

Tuffier.—Archive Generales de Medecine Paris, 1889, i, 335-360.

Mackenzie, S. C.—In his Medico-Legal Experience in Calcutta, Edinburgh, 1891, 98.

Page, H. W.—Annals Surgery, Phila., 1894, xix, 513-529.

Baldy, J. M.—Transactions College Physicians, Phila., 1896, xviii, 14-17.

Haushalter, P. et Jacques.—Presse Medicale, Paris, 1897, 233-36.

Morris, H.—Edinburgh Medical Journal, 1898, ns iii, 11-32.

Paton, E. P.—British Medical Journal, London, 1900, i, 71.

Stehmann, H. B.—American Gynecological & Obstetrical Journal, New York, 1900,xvii, 360-309.

Wells, J. M.—Ruptured ureter. Transactions National Eclectic Association, Chicago, 1903-4, xxxii, 257-259.

Estape, G.—Un caso de ruptura de uretra complicado de absceso perineal y pelvi-rectal. Revue di cien Medecine de Barcelona, 1904, xxx, 536-548.

Brown, F. T.—Traumatic rupture of ureter, extravasation of urine, pyonephrosis, nephrectomy. Annals Surgery Phila., 1905, xli, 127-129.

Wells, J. M.—Transactions National Eclectic Medical Association Chicago, 1903-4, xxxii, 257-259.

Cumston, C. G.—Injuries of the ureters during gynecological operations American Journal Urology, New York, 1904-5, i, 473-487.

Smith, A. L.—Three cases of repair of injury to the ureter. Two by transplantation into the bladder, and one by end-to-end suture. American Journal Obstetrics, New York, 1905, li, 752-762.

Vaughn, C. T.—Gunshot wounds of the ureter, two cases of ureter-vesical anastomosis American Journal Medical Sciences, New York, 1905, cxxix, 449-453.

Heaton, G.—A case of nephrectomy for traumatic rupture of the ureter Birmingham Medical Review, 1906, lix, 139.

Hall, R. B.—Traumatism of the ureter and pelvis of the kidney with report of cases Lancet-Clinic Cinti., 1906, ns., lvii, 10-13.

Nash, W. G.—A case of rupture of the ureter, drainage, recovery. Lancet, London, 1906, ii, 1348.

CHAPTER XII.

FISTULA.

1856-1905.

Fistula may be congenital or result from stone, disease or trauma, by surgical operation, or otherwise.

It may be single or multiple, and terminate within the alimentary, biliary or urinary tract, peritoneal cavity, Fallopian tube, uterus, vagina or upon the external surface of the body.

Spontaneous closure may occur, but such a termination is rare. The most frequent cause is injury inflicted during a surgical operation, for the removal of uterine neoplasms per vaginum.

Nephrectomy is sometimes necessary for their relief when due to any cause.

BIBLIOGRAPHY.

Alquie.—Bulletin Societe de Chirurgie, Paris, 1856-7, vii, 454-459.

Freund, A. G.—Vratislaviac, 1860.

Urinieder-Fisteler (Om) Hospital Tidschrift, Kjobena, 1860, iii, 101.

Laugier.—Gazette d Hopitaux, 1860, Paris, xxxiii, 273.

Simon, G.—Beitrage z. Geburtsh. und Gynakologie, Wurzburg, 1860, iv, 1-23.

Freund, W. A.—Klinische Beitrage z. Gynakologie, Breslau, 1862-3, i, 33; ii, 14.

Freund, W. A. Joseph, L.—Berliner Klinische Wochenschrift, 1869, vi, 504-509.

Duclout, L.—Gazette Medicale, Paris, 1869, 3 s, xxiv, 42-68-111-169.

Salzmann, M.—Rin Fall einer Harnleiter Gebarmutterfistel. Tubingen, 1876.
Kurz, E.—Meemorabilien Heilbrand, 1876, xxi, 222-224.
Muller.—Archiv. f. Gynakologie, Berlin, 1879-80, 264.
Nicoladone, C.—Wiener Medicinische Wochenschrift, 1882, xxxii, 389.
Sutton, J. B.—British Medical, Journal, London, 1889, ii, 1392.
Futh, J.—Nederland Tijdschrift v. Verlosk en. Gynaecologie, Haarlem, 1890, ii, 266-277.
Iversen, A.—Nor d Medical Ark. Stockholm, 1892, N. F. ii, Heft 4, 1-34.
Bazy.—Dr. Chaput (Rapport) Bulletin et Memoire Societe de Chirurgie, Paris, 1893, ns, xix, 309-315.

CHAPTER XIII.

TUBERCULOSIS.

1844-1905.

Tuberculosis of the ureters is common as a secondary deposit resulting from tuberculosis of the kidney. This is the most frequent source. Primary tuberculosis is evidently rare. Bang, in 1874, and Gemmell, in 1886, each report such a case. There does not seem to be any portion of the ureter more frequently the seat of primary tuberculosis than another. While in the secondary form it is near the bladder, when that organ is involved, or near the kidney when it is diseased.

Tirard in 1891 reported a specimen of tubercular growth in the ureter of a boy aged 5 years. There was a family history of tubercle, the mother having died of consumption and one brother from inflammation of the brain. Necropsy: in the left ureter a hard nodule existed at about the junction of the upper and middle third of the tube which was dilated above this point and constricted below. A probe could not be passed through this nodule without force. On slitting it open the ureter was found to be studded with small tubercles and at the nodular swelling to be completely surrounded by a rugged mass, the surface of which was hard and rough, apparently from the deposition of salts (urates) upon a caseous surface. Right ureter appeared normal. Upon roscopical examination of the left kidney

the usual appearance of consecutive cirrhosis were found, the epithelium in the tubes near the glomeruli was swollen and granular, that in the straight tubules somewhat atrophied, while the tubules were dilated irregularly. A relatively large number of nuclei was found over the Malpighian tufts. With regard to the tubercular growth in the ureter it is interesting to note that no tubercles were to be seen on the mucous surface of the bladder or on the surface or in the substance of the kidney.

Hamilton, in 1898, reported a case of tuberculosis of the right kidney and ureter in an unmarried woman aged 23 years. There was no history of tuberculosis in her family. Operation, kidney removed. On examination of the kidney removed it was found that the typical appearances of tuberculous pyelitis were present. The pelvis of the ureter was dilated and coated here and there with miliary tubercles. The ureteral obstruction was evidently caused by dilation of the pelvis and the resulting atrophy of the renal cortex.

BIBLIOGRAPHY.

Mignon.—Bulletin Societe Anatomie, Paris, 1844, xix, 88-93.

Caudemont.—Bulletin Societe Anatomie, Paris, 1844, xix, 113-121.

Hiffelsheim.—Comptes Rendus Societe de Biologie, 1850, Paris, 1851, ii, 6.

Legrand, A.—Bulletin Societe Anatomie, Paris, 1861, xxvi, 255-260.

Bang, B. J. F.—Hospital Tidschrift Kjobenh. 1774, 2 R. i, 561-565.

Bonneau, A.—Bulletin Societe Anatomie, Paris, 1889, lxiv, 361.

Tyson, J.—Transactions Pathological Society. Phila. (1887-9) 1891, xiv, 195.

Tirard, N.—Transactions Pathological Society, London, 1891-92, xliii, 91.

Gemmell, S. Newman, D.—Glasgow Pathological & Clinical Society, (1886-91) 1892, iii, 151-154.

Fischer, H.—Paris, 1892.

Desbonnets, V.—Journale d Science Medicale de Lille, 1894, ii, 271-275.

Hamilton, W. D.—Medical News, New York, 1898, lxxiii, 374.

Halle N. & Motz B. Annals d Maladies de Organe Genito-Urinaires Paris, 1906, xxix, 161-162.

Albarran, J. Cottet, J.—Bulletin Societe Anatomie, Paris, 1898, lxxiii, 401-404.

Fischer, H.—Ureterite tuberculeuse, Paris, 1902.

Haushalter.—Tuberculeuse de l'uretere chez un enfant de 2 ans. Revue de medecine de l'est. Nancy, 1904, xxxv, 237.

Baldy, J. M. & Schumann, E. A.—Tuberculosis of the kidney ureter and bladder. American Medicine, Phila., 1904, viii, 1125.

Schwyzer, A.—A method of total excision of the ureter with remarks on kidney tuberculosis. St. Paul Medical Journal, 1905, vii, 1-11, 1 pl.

CHAPTER XIV.

BENIGN NEOPLASMS.

1827-1905.

Benign neoplasms of the ureter are common, many of them are referred to in the chapter on pathology and a few have been selected for consideration in a special chapter.

Nicod, in 1827, reported a case of polypus of the ureter and vessels; also the same author in 1835 polypus in the canal of the ureter.

Sanderson, in 1863, reported on a specimen on fibro-cellular tumor sorrounding and constricting the right ureter. The ureter is surrounded by a pear-shaped mass compressed from behind forwards and measuring about 3 inches from base to apex and 2½ inches across. Its base is incorporated with the capsule of the kidney while at its upper margin it is in relation with the renal vessels. In its passage through the tumor the ureter is constricted at its origin to the diameter of a very small crow-quill. The pelvis of the kidney is much dilated and contains three or four rough mulberry calculi of a reddish-brown color; in other respects the organ is healthy. On section three kinds of substance may be distinguished. Immediately around the ureter the naked eye aspect of the tissue is colloid; microscopically it is found to consist of a reticulum of very delicate fibres infiltrated with gelatinous structureless juice. Outside of this it is of firmer consistence and exhibits either masses

of roundish nuclei, fusiform nuclei in process of transformation into nuclear fibres or in the firmest parts of the mass, wavy bands of whitish fibrous tissue.

BIBLIOGRAPHY.

Nicod, P. L. A.—Memoires sur les polypes de l'uretre et de la vessie, Paris, 1827.

Nicod, P. L. A.—Traite sur les polypes et autres carnosities du canal de l'uretere et de la vessie. Paris, 1835.

Mayor.—Un rein dont la bassinet enornement dilate est rempli d'urine la tumeur comprime l'entree de l'uretere. Bulletin Societe Anatomie de Paris, 1843-4, xviii, 138.

Sanderson, B.—Transactions Pathological Society, London, 1862-3, xiv, 195.

Litten, M.— Archives f. Pathologische Anatomie, etc., Berlin, 1876, lxvi, 139-144, 1 pl.

Gaillard.—Papillome de la vessie, dilatation consecutive de l'uretere droit pyeolo-nephrite. Progre Medicale, Paris, 1877, v, 745.

Ricci, G. B.—Roccoglitore Medicale Forli, 1879, 4s, xii, 243-252.

Albarran, J.—Annales d Maladie d'Organes Genito-Urinaires, Paris, 1900, xviii, 701-918-1179.

CHAPTER XV.

MALIGNANT NEOPLASMS.

1830-1905.

Malignant neoplasms of the ureter include both sarcoma and carcinoma, primary and secondary. The various types of each are found. Carcinoma is the most frequent, and is usually of a secondary variety.

Targett, in 1891, presented a specimen of sarcoma of the ureter taken from the body of a man aged 46 years. Autopsy showed pelvis of right kidney partially embedded in growth, and its cavity, together with the calices of the kidney was widely dilated in consequence of the obstruction of the ureter. From its upper extremity to the bifurcation of the right common iliac artery the right ureter was surrounded and invaded by the new formation; below that level it passed to the back of the bladder as a large solid cord in size, and appearance on section closely resembled the spinal cord; within the bladder the growth projected at the orifice of the right ureter as a polypoid tumor the size of a cherry, the pedicle of which was covered with a healthy mucous membrane, but its summit around the opening of the ureter was superficially ulcerated. Histologically the tumor was a round-celled sarcoma. The invaded ureter was examined near its vesical end and the microscopic sections showed that the lumen of the duct was entirely filled with small round cells

and granular debris. The mucous membrane had disappeared and groups of round cells were to be seen between the planes of the muscular coat. The preparation is of interest inasmuch as the whole length of the ureter was invaded by a new growth from without, which having reached the interior of the duct, filled and even distended its channel and thus spread downwards to the bladder.

Hektoen, in 1896, reported a case of primary carcinoma of the ureter in a woman aged 50 years. Says, while it is not unusual for the ureter to become invaded by carcinoma extending from the uterus, the rectum or the urinary bladder, primary carcinoma of the ureter is very uncommon. Recent systematic works on surgery and on tumors contain no mention of carcinoma of the ureter. Indeed the entire list of primary tumors of the ureter described in the literature is very short. Lebert describes a polypoid fibroma; Thornton a papillary fibroma upon which a calculus was situated; Neelsen a typical papilloma of the upper part of one branch of a partially reduplicated ureter causing a large hydronephrosis of the corresponding half of the kidney. Chian records a so-called cholesteatoma of the ureter and Ribbert a myosarcoma. Orth credits Litten and Hartman with having observed carcinoma of the ureter. Wising and Blix describe a case of primary carcinoma of the right ureter with secondary tumors in the mesenteric glands, the rectum and the liver, with hydronephrosis, in a woman whose urine did not contain anything abnormal. There

was a hydronephrosis containing 1,000 grams of fluid. The upper 12 cm. of the ureter was spirally twisted, hard and thick, converted into a solid string the size of the little finger. On the cut surface there was no lumen, but in place of it a loose, yellowish, gray disintegrating neoplasm. The wall of the rectum was the seat of multiple submucous nodules due to extension from the metastasis in the retroperitoneal glands. Hedenius describes hazel and walnut-sized carcinomatous nodules in the mucous membrane of the pelvis and the ureter, which were situated in the mucous membrane and pronounced by Hedenius to be primary carcinoma.

The following case fatal after 8 months after the first painful symptoms appeared. The clinical diagnosis was osteosarcoma of the pelvis. Anatomic diagnosis: Tumor of the pelvis involving the right ureter, hydronephrosis and atrophy of the right kidney, atrophy of the heart, pulmonary emphysema, chronic adhesive peritonitis, fibromyomata of the uterus. Left kidney weighs 140 grams, the capsule is free, the surface smooth, the consistence firm, the corticle markings not distinct. The right kidney is not present as such. In its place is a cystic cavity containing about 800 c.cm. of a slightly turbid grayish thick fluid. The walls of this cavity whose inner surface is smooth are quite thin and directly continuous with the post-peritoneal tumor mass about to be described. The tumor appears to spring from the inner surface of the right ilium. It forms an irregular mass

about the size of a child's head. On the cut surface it is whitish-gray in color, its consistence is soft and it contains numerous small irregularly shaped cavities filled with creamy, semi-solid material. The ureter cannot be identified at the upper limit of the tumor. A probe passed upward from the opening in the bladder becomes arrested about 2.5 cm. above. Careful dissection shows the ureter to be entirely lost in the tumor tissue. Upon removal of the tumor it is found that the inner surface of the ilium is eroded. The retro-peritoneal glands are not enlarged. Microscopic examination shows the structure of the tumor to be that of a typical medullary carcinoma.

The reasons for regarding this carcinoma as originating in the ureter are the following:

1. The location—there being no other archiblastic structure in the vicinity that the ureteral lining, and the direct involvement of the ureter in the tumor, the larger part of the canal being entirely lost in the tumor mass, the hydronephrosis and complete atrophy of the kidney being due to complete destruction and closure of the lumen of the ureter.

2. The marked similarity of the epithelial cells of the tumor to the cells lining the ureter, the transitional character of the latter being well preserved in the tumor.

3. The absence of carcinoma elsewhere and the voluminous size of the primary retro-peritoneal growth.

It is important to note that in carcinoma as well as other tumors of the ureter occlusion of th[illegible]f the latter and consecutive hy-

dronephrosis with atrophy of the kidney seemed to occur quite regularly as far as can be concluded from the few cases now at hand. The thorough and systematic study of early carcinoma of the ureter—the earlier the better —would throw needed light upon the more exact origin and development of this rare but interesting form of malignant epithelial tumor.

Drew, in 1897, reported on a case of villous carcinoma of pelvis, of kidney, ureter and bladder causing hydronephrosis in a male, aet. 56 years. Nephrotomy was performed, the kidney was drained by a large tube—death.

Autopsy—The ureter in the greater part of its extent is much dilated and filled with pus, along its whole length, the mucous membrane is beset with tufts of delicate villous growth attached by narrow base. There is no evidence of thickening of the wall of the ureter beyond what is due to inflammatory adhesions of the surrounding cellular tissues. The upper end of the ureter before it joins the pelvis is contracted apparently by the condensed fatty tissue around it and not by the new growth. The lower end is dilated as far as the orifice in the bladder, the intra-muscular portion being unusually wide.

BIBLIOGRAPHY.

Bergeon, C. C.—Bulletin Societe Anatomie, Paris, 1830, v, 127-133.

Ozanam.—Bulletin Societe Anatomie, Paris, 1846, xxi, 55-59.

Civiale.—Monitore d'Hopitaux, Paris, 1854, ii, 729-731.

Goetz, E.—Bulletin Societe Anatomie, Paris, 1875, i, 638.

Ward, S. B.—Archives Medicine, New York, 1882, vii, 1-17.
von Limbeck, R.—Zeitschrift f. Heilkunde, Prag. 1887, viii, 55-56, 1 pl.
Thiery, P.—Bulletin Societe Anatomie, Paris, 1888, lxiii, 368-372.
Drappier.—Bulletin Societe Anatomie Clinique de Lille, 1889, iv, 13-15.
Orrillard, A.—Bulletin Societe Anatomie, Paris, 1890, lxv, 549-552.
Willutski, E. J.—Konigsberg, 1891. Ueber ein primares Sarkom des Ureters.
Targett, J. H. Transactions Pathological Society, London, 1891-2, xliii, 92.
Boinet & Aslanian.—Fibro-sarcoma kystique du rein gauche avec obliteration de l'uretere lithiase en branche de corail du calice et des bassinets vaste pyonephrose consecutive. Revue de Medecine, Paris, xiii, 727-732.
Rundle.—Primary epithelioma of the ureter. Medical Week, Paris, 1895; iii, 555.
Hektoen, L.—Journal American Medical Association, 1896, xxvi, 1116.
Solger, B.—Zur Kenntniss der spindelformigen Erweiterungen des menschlichen Harnleiters. Anatomische Anzeiger, Jena, 1896, xii, 347-352.
Drew, D.—Transactions Pathological Society, London, 1896-7, xlviii, 130-135.
Pal, J.—Uretercarcinom, tod, Pahrbuch d Wien k.k. Krankenanst, 1895, Wien u. Leipzig, 1897, iv, part ii, 45.
Cathelin, F.—Uretere surnumeraire du cote droit chez une jeune fille atteinte de carcinome rectal et ovarien. Bulletin Societe Anatomie, Paris, 1898, lxxiii, 596-599.
Gertsein (Kurt) Ein fall von primarem Krebs der rechten Ureteremundung. Inaugural—Dissertation Kiel, 1902, Mai, No. 53.
Metcalf, W. F. & Safford, H. E.—A case of carcinoma of the ureter apparently induced by a calculus lodged in its juxtavesical portion. American Journal Medical Sciences, Phila. 1905, ns, cxxix, 50-63.
Mackendrodt.—Zeitschrift f. Geburtshulfe u. Gynakologie Stittgart, 1905, liv, 355-359.
Boldt, H. J.—American Journal Obstetrics, 1906, liii, 263.

CHAPTER XVI.

PATHOLOGY.

1616-1905.

Jones, in 1848, on the minute anatomy of scrofulous deposits in the ureter says: It is, I believe, not yet completely ascertained what is the primary situation of the scrofulous matter which in the disease termed "strumous pyelitis" is found, forming a layer on the internal surface of the ureters or pelves of the kidneys. It has been considered by some to be deposited on the mucous surface; by others, beneath that surface in the submucous areolar tissue. In the greater number of cases it is scarcely possible to determine which of these two opinions is correct, inasmuch as the deposited matter has accumulated to such an extent that the mucous membrane in the situation occupied has wholly disappeared. I have recently had an opportunity of examining an instance of this scrofulous deposit in the ureter in an early stage of its formation, and will now mention the evidence I obtained in favor of the opinion which assigns the submucous tissue as the seat of the deposit.

Male, aged 11, died with scrofulous disease of the hip-joint. In the left ureter a small patch of scrofulous deposit was found. None, however, existed in the bladder nor I believe in any other part of the urinary passages. Kidneys were healthy.

Hilton, in 1863, reported a case of enlarged middle lobe of prostate with disease of the kidneys, the right ureter dilated to the size of the small intestine in a male aged 60 years. Autopsy showed ureters and pelves of kidneys greatly dilated. On the right side the pelvis was as large as the kidney and the ureter as capacious as the small intestine. When opened, milky fluid poured out but the mucous membrane was not much altered in character. Both kidneys were wasted and dissection showed numerous white lines as if an inflammatory product had been thrown out in their tissue, capsules firmly adherent, irregular on surface and cortex wasted.

Gervis, in 1864, reported on specimen of the bladder, kidneys and ureters in a case of distension of ureters, pelvis of kidney, etc., in an infant aged 5 weeks: There were two points of much interest in connection with this specimen. First, as to what could have constituted the obstruction, for after birth the child had had no apparent difficulty in micturition, so that whatever has proved the obstruction before birth must have ceased to do so after birth; and secondly, it appeared remarkable that sufficient urine should be secreted during the last few weeks of intra-uterine life to produce pressure effects which simulated those resulting from a stricture of many years standing in an adult. At the time of making the inspection, the bladder was found nearly empty, but both ureters, and especially the left were greatly distended although the com-

munication between them and the bladder was unimpeded.

Sherard, in 1870, reported a case of cystic disease of the kidney with dilatation of the ureter and atrophy of the bladder in a male aged 31 years; death 17th day. Post-mortem showed left kidney seemed to be in a healthy condition. Right kidney, whole of it, presented the appearance of a multiple cyst, one large sac divided first into two smaller sacs and each of these two smaller sacs divided into four others still smaller, all communicating through the pelvis with the ureter. The right ureter was also greatly enlarged, being one inch in diameter at its junction with the kidney and one inch in diameter where it emptied into the bladder. The bladder was so much contracted as to hold only about two drachms of fluid. Its walls were very thick, at least half an inch, and it was closely attached to the pelvic bones. In this case the sacculated kidney and the dilated ureter evidently performed vicariously the functions of the bladder as a reservoir of the urine, their joint capacity being about three ounces. The entire tubular structure of the right kidney being destroyed, the whole labor of the urinary secretion fell upon the left kidney. The urine thus separated from the blood by the left kidney passed through the left ureter into the atrophied bladder and then welled up filling completely the dilated right ureter and kidney. The hydraulic pressure thus exerted must have extended also to the left kidney, and doubtless to this hydraulic pressure, added to the ex-

citement from overwork, is to be attributed the intense pain exhibited by that organ. The pathology of this disease is not very evident but it may help to a probable solution to know that cancer was hereditary in the patient's family.

James, in 1877, on dilatation of the ureters and renal pelves, hydronephrosis, says: Obstruction to the escape of the contents of a hollow viscus or of the secretion of a gland causes dilatation, and this pathological process in the case of a kidney gives rise to the conditions of cystic kidney and hydronephrosis, pyonephrosis or surgical kidney. In these affections the position of the obstruction is different. In the former, the small tubules are obstructed causing a formation of cysts varying in size and number in the substance of the organ causing a dilatation, varying in degree, of the ureter and pelvis of the kidney. He reports one case and concludes as follows:

1. That increase in the frequency of micturition is capable of causing a greater or less damming up of the urine in the ureters, renal pelves and tubules and consequent pale color, and diminution in the sp. gr. of the urine.

2. That this damming up if continued will in time cause dilatation of the ureters and renal pelves and a more or less hydronephrotic condition of the kidneys.

Gouley, in 1880, reported on Mercier's operation for valvule at the neck of the bladder with a male aet. 70 years and reported on hypertrophy of the muscles of the ureters—a new in pathology. He says in connection with

this case: I wish to direct your attention to another important fact, an observation of which I have not seen recorded. It is that in at least a large proportion of cases of valvule at the urethro-vesical orifice, there is a second obstruction of the ureters which divides the bas fond into two nearly equal portions. I have in my possession at least a dozen specimens illustrating this point. The significance of this is that the stagnant urine may be drawn from either of these halves without completely emptying the other. I have repeatedly made the observation upon the living subject, first emptying the posterior half without emptying the anterior, then withdrawing the catheter slightly. From one to two or even three ounces of urine have been drawn from the anterior half of the bas fond. In some cases I have drawn the urine from the posterior half of the bas fond after emptying the anterior. What is the practical deduction from this observation? It is simply that we should divide or excise the portion of the bas fond in the median line so that the posterior half of the bas fond would be emptied in the act of urination in the event of a successful incision or excision of the valvule to the anterior half.

Dakin, in 1887, in a specimen of atrophied kidney and dilated ureter from a female child aged two years who died of anaemia connected with rickets and had no symptoms of disease of the genito-urinary organs; left ureter is elongated tortuous and dilated to about the size of the little finger and has very thick

walls; it opens into the bladder by a large orifice admitting, when fresh, an ordinary sized pencil.

Mann, in 1894, reports on inflammation of the ureters in the female and speaks of the pathological anatomy as follows: "I have had no opportunities of studying this disease post-mortem, and have not had access to any work treating fully the pathological anatomy of the ureters. Judging from what I have observed clinically and from the reports of cases of other observers, I think we may distinguish several forms or stages of ureteritis.

First, the catarrhal form in which there is a little swelling of these tubes with desquamation of the epithelial lining. It is my belief that in slight cases, judging from the evidence gained by examination as well as from the symptoms, the force of the disease is first spent on the lower end of the ureter, especially the part in front of the broad ligament. In other cases, the surface of the tube seems to give forth a plentiful purulent secretion which indicates an ulcerated or granulating condition of their lining membranes. Tournier says that when these ulcerations occur, a thickening in the surrounding connective tissue takes place with perhaps adhesions of the peritoneum giving an irregular outline to the course of the ureters. Sometimes the tube is greatly thickened by inflammatory deposits in the walls. This may reach a point where the ureters are as large as a lead pencil or even larger. In the case of obstruction, dilatation even to an extreme degree may take place accompanied

by a certain amount of thickening. Tournier likens these dilated and thickened ureters to the arteries in a cadaver. I have now under observation a case in which the ureters are greatly thickened and in which the right one seems to be dilated or sacculated just behind the broad ligament. The pelvis of the kidney is doubtless generally more or less involved with the ureters, but that it is always so is not proved. A physical examination in several cases of so-called "pyelitis" has shown that the ureters were the parts chiefly involved.

That these conditions may end in involvement of the pelvis and of the kidney itself I have had clinical evidence. In several cases perinephritic abscesses have developed and in two abscess of the kidney has developed as proved by operation. Usually both ureters are involved in the pathological processes but often one side, usually the left, is much more seriously affected than the other.

Robinson states that the chief functional relation of the tunica mucosa ureteris is atrophic degeneration of the epithelium in the segments of the ureter supplied by the arteria ureterica proximal and distal. All functional ureteral irritations to which are due to periodic hyperaemia ending in hypertrophy will finally indicate decrease in number and atrophy of muscle, nerve and epithelial cells (parenchymatous cells) with an increase of connective tissue stroma cells (frame work cells).

In age relations of the ureter arterio-sclero- ys the chief role. Its main effect is the tunica muscularis, (b) tunica fi-

brosa, (c) tunica mucosa.

The author has three dissection illustrations.

BIBLIOGRAPHY.

Paaw, P.—De ureterum exulveratione stomachi dolore febre colliquante et animi deliquio pro nobili quadam foemina. In his: Succenturiatus Anatomie, Lugd. Bat., 1616, 90-101.

Van Beekhoven—De Wind, J.—De ureteribus et vesica urinaria. Lugd. Bat., 1734.

Fanton, J.—De renibus et prinum de succenturiatis de ureteribus et vesica. In his Dissertation Anatomie Taurini, 1745, 296-348.

Jalon, P.—Von einem wider Willen abdehenden Urin. Ausserliche Medicinische Chirurgie. Abhandlung d. Kais. Akademie d. Naturf. Nurimberg, 1763, xii, 249-252, 1 plate.

Becker, J. H.—Krankheitsgeschichte eines Sectionsberichet und einigen Bermerkungen. Journal d Practisch Heilkunde, 1815 xli, St. 6, 3-93.

Menon, V.—Dissertation sur le spasme de la vessie et de l'uretere. Paris, 1829.

Sestie.—Un cas de dilatation du bassinet et de l'uretere avec vegetations dans ce dernier conduit. Bulletin Societe Anatomie, Paris, 1834, ix, 7.

Civiale.—Du spasme de l'uretere et du col de la vessie. Gazette Medicale, Paris, 1834, 2s, ii. 752-756.

Dubouchet de Romans, H.—Nouveau traite des retentions d'urine occasiones par les retrecissements du canal de l'uretre par les maladies de la glandee prostate et par celles de la vessie, de la blenorrhagie et de sa cure Paris, 1834.

Rayer, P. F. O.—Traite de maladies des reins et des alterations de la secretion urinaire etudies en elles-memes et dans leurs rapports avec les maladies des ureteres de la vessie de la prostate de l'urethre. 3 Vols. Paris, 1837-41.

Nafti, P.—Observations de vessie separee en deux cystite; retention d'urine; ulceres fistules et abces urineux nephrite; hypertrophie et suppuration de la prostate uretrite. Gazette Medicale, Paris, 1840, 2s, viii, 154.

Wichmann, H. H.—De morbis ureterum. Bonnae, 1841.

Deville.—Retriccement du canal de l'urethre in-

flammation de la vessie et de l'uretere; convulsions; mort. Bulletin Societe Anatomie, Paris, 1843, xviii, 198.

Jones, H.—Transactions Pathological Society, London, 1846-8, i, 283.

Herrick, W. B.—Case of accumulation of fluid in the ureter and pelvis of the kidney upon the right side of long standing followed by retention and suppression of urine, acute inflammation of the bladder and left kidney terminating in suppurat ion and death. Illinois & Indiana Medical & Surgical Journal, Chicago, 1847-8, iv, 306-310.

Caudmont.—Development of mucous follicle in bladder, closure of orifice of ureter, retention of urine. Bulletin Societe Anatomie, Paris, 1850, xxv. 345.

Laboulbene.—Dilatation de l'uretere et du rein gauche. Comptes Rendus Societe de Biologie, 1850, Paris, 1851, ii, 166.

Morel-Lavelle.—Note sur un cas de dilatation de l'uretere. Comptes Rendus Societe de Biologie, 1854, Paris, 1855, 2s, i, 91.

Caudment.—Note sur l'efficacite de l'association du cubebe et du copahu dans les affections du col de la vessie et de la region prostatique de l'uretere. Bulletin General de Therapeutique, Paris, 1861, lxi, 68-71.

Hilton.—Lancet, London, 1863, ii, 96.

Gervis, H.—Transactions Obstetrical Society, 1864, London, 1865, vi, 221, 1 pl.

Klob, J.—Steine in beiden Ureteren mit consecutiver Nierenatrophie und Harnblasenentzundung. Medicinisches Jarhbuch Wien, 1868, xv,127.

Heller, A.—Hydronephrose der einen Nierenha'fte bei doppelten Ureteren und Nierenbecken. Deutsches Archiv. fur Klinische Medicin. Leipzig, 1869, v, 267-270.

Sherard, C. C.—New York Medical Journal, 1870 x, 266-268.

Malherbe.—Dilatation des ureteres; cystite chronique, hypertrophie de la prostate. Bulletin Societe de Anatomie Paris, (1871) 1873, xlvi, 321.

Hutinel.—Dilatation considerable d'un uretere a son abouchement dans la vessie simulant une vessie biloculaire. Bulletin Societe Anatomie, Paris, 1873, xlviii, 695-697.

Hirschsprung, H.—Hydronefross tilstopning af begge ureterer. Med. Urinsten Hospital. Tidschrift Kjobenh, 1873, xvi, 82.

Cianciosi, A.—Considerazioni anatomo-fisio-pathologische sulla vesica urinaria e sul canals dell'uretra. Raccoglitore Medicale Forli, 1875, 4s, iv, 49-81.

von Nussbaum, J. N.—Bildung eines kunstlichen Harnleiters. Aerztich Int. Blatt Munchen, 1876, xxiii, 63-67.

Landau, L.—Ueber Entstehung, Erkenntniss und Behandlung der Harnleiterscheidenfisteln. Archiv f. Gynakologie, Berlin, 1876, ix, 426.

James, A.—Edinburgh Medical Journal, 1877-8, xxiii, 135-140.

Gouley.—Medical Record, New York, 1878, xiv, 470.

C (V.P.)—De la dilatation de les ureteres; diagnostico. Siglo Medical, Madrid, 1879, xxvi, 485.

Wrany, A.—Verdoppelung eines Ureters; Ausmundung des uberzahligen in des Blasenhals; Dilatation und Catarrh desselben, sowie eitrige Nephritis als Folgen. Osterreich Jahrbuch f. Paediatrie Wien, 1879, i, 105-110.

Scoker, J.—Ueber die Folgen der Unterbindung der Ureteren und der Nierenarterie bei Thieren im Zusammenhange mit anderen pathologischen Prozessen. Archive fur Pathologische Anatomie, etc. Berlin, 1880, lxxxii, 552-554.

Champneys, F. H.—Dilatation of the ureters in extroversion of the bladder. St. Bartholomew's Hospital Reports London, 1880, xvi, 111-114.

Galignani, G.—Ricorrenti coliche con forte tumefazione renale per chiusura spasmodica dell uretere sinistro. (lithiasi urica?) Guglielmo da Saliceto Piacenza, 1880-81, ii, 332-337.

Reich, H.—Fall von gleichzeitigem Verschluss beider ureteren durch Nierensteine; Tod nach viertagiger anurie ohne uramische Erscheinungen. Aerztliche Mittheilung—a. Baden. Karlsruhe, 1881, xxxv, 169-172.

Prentiss, D. W.—Case of double hydronephrosis with dilatation of the bladder and ureters due to disease of the prostate gland. Maryland Medical Journal, Baltimore, 1882-3, ix, 588-591.

Wany.—Specimens of bladder, ureters and kid-

neys from a case of surgical kidney. Maryland Medical Journal, Baltimore, 1882-3, ix, 326.

Lannois.—Hydronephrose du rein avec dilatation de l'uretere. Memoirs et Comptes Rendus Societe de la Medecine de Lyon. (1882) 1883, xxii, pt. ii, 145.

Bischoff, E.—Verlegung beider Ureteren durch Harnsteine; Anurie von 23 tagiger Dauer. Deutches Archive fur Klinische Medicin. Leipzig, 1884-5, xxxvi, 183-1888.

Edwards, F. S.—Dilatation and hypertrophy of the bladder and ureters with disorganization of the kidneys due to prostate enlargement. Proceedings West London Medico-Chirurgical Society, London, 1884, i, 36.

Daland, J.—Dilatation of ureter and hypertrophy of the bladder. Transactions Pathological Society, Phila., 1885-7, xiii, 137.

Berger.—Corps entrangers de l'ureter et de la vessie (fragments de tuyau de pipe en terre) extraction par la voie perineale guerison. Bulletin et Memoires Societe de Chirurgie Paris, 1885, xi, 345-350.

Dakin, W. R.—Transactions Pathological Society, London, 1886-7, xxxviii, 169.

Pertik, O.—Ureteritis es pvelitis, chronic cystica polyposa. Orvosi Hetil, A. Szemle, Budapest, 1887, ii, 306.

James, A.—Dilatation of the ureter and renal pelvis; hydronephrosis. In his Physiological and Clinical Studies, Edinburgh, 1888, 41-48.

Neelsen.—Beitrage zur pathologischen Anatomie der Ureteren. Beitrage zur Pathologischen Anatomie u. z. Allgemeinen Pathologie. Jena, 1888, iii, 277-288, 2 pl.

Kolisko, A.—Ein Beitrag zur pathologischen Anatomie der Ureteren. Wiener Klinische Wochenschrift, 1889, ii, 917-919.

Byford, H. T.—A case of ureteritis a clinical report. North American Practitioner, Chicago, 1889, i, 28-30.

Playfair, J.—Kidneys, ureter and bladder from a case of hydronephrosis. Transactions Medico-Chirurgical Society Edinburgh, 1890-91, ns x, 74.

Lemoine.—Note sur un cas d'hydronephrose acquise du rein gauche consecutive a un retrecissement du l'uretere.

Guyon.—Cystalgie symptomatique de lesions renales et pyonephroses consecutives a des lesions vesicales; influence du traitement de la vessie sur les uretero-pyelites. Annales de Gynecologie et d'obstetrique, Paris, 1890, xxxiv, 81-86.

Parish, W. H.—The urethra bladder and ureters during pregnancy labor and the puerperium. Proceedings Philadelphia County Medical Society, Phila., 1891, xii, 349-357.

Keibel, F.—Ueber die Harnblase und die Allantois des Meerschweinschens nebst einer Bemerkung die Entstehung des Nierenganges (ureters) bei Saugethieren. Anatomischer Anzeiger Jena, 1892-3, viii, 545-554.

Hunter & Edginton.—Specimen of pyelo-nephritis dilated ureters and cystitis in a child of five years. Transactions Glasgow Pathological and Clinical Society, 1893-5, v, 94-99.

Pisenti.—Ueber die parasitische Natur der Ureteritis chronica cystiça. Centralblatt f. Allgemeine Pathologie u Pathologische Anatomie, Jena, 1894, v, 657.

Kolimann, A.—Neuer aufschraubbarer harnrohrendilator mit vier brachen. Centralblatt f. d. Krankheiten d. Harn-u. Sexual-Organe, Leipzig, 1894, v, 362-364.

Mann, M. D.—Inflammation of the ureters in the female. American Journal Medical Sciences, Phila. 1894, ns cviii, 125-140.

Rovsking, T.—Surgical maladies of the kidney and ureters after lectures held in the University of Copenhagen, Kjobenhavn, 1895.

Blackwood, C. Mabel.—Congenital hydronephrosis with or without dilatation of the ureters and bladder. Edinburgh Medical Journal, 1895-6, xli, 919-921.

von Kahlden, C.—Ueber ureteritis cystica. Beitrage zur Pathologischen Anatomie, u z Allgemeinen Pathologie, Jena, 1895, xvii, 562-595, 1 pl.

Tuffier.—De l'hydronephrose intermittente par condure de l'uretere. Revue Pratique de Trav. de Medecine, Paris, 1896, liii, 171.

Partservski, A.S.—Combined nephritis complicated with croupous inflammation of the pelvis of the k[illegible] d ureters. Medical Obozrisk Moskow, 1-888.

Legueu, F.—Hydronephrose par retrecissement de l'uretere. Annales d. Maladies d. Organe Genito-Urinaires, Paris, 1896, xiv, 1117-1122.

Reynolds, E.—Some aspects of ureteritis in women. American Journal Obstetrics, New York, 1896, xxxiv, 19-27.

Blume, C. A.—Anuri ved lithiasis obturation af begge ureterer. Hospital Tidschrift Kjobenh, 1896, 4 R iv, 969-973.

Funke, E.—Ueber den Verlauf der Ureteren. Deutsche Medicinische Wochenschrift, Leipzig u. Berlin, 1897, xxiii, 273-275.

Delbanco, E.—Cystitis und ureteritis cystica und ueber die septenbildung in der Schleimhaut der ableitenden Harnwege. Monatschrift f. Praktische Dermatologie. Hamburg, 1897, xxv, 1-24.

Fenger, C. & Stanton, S.C.—Diseases of the ureter in American Text-Book of Genito-Urinary Diseases. Phila. 1898, 470-542.

Marckwald.—Die multiple Cystenbildung in der Ureteren und der Harnblase, sog. ureteritis cystica. Munchen. Medicinische Wochenschrift, 1898, xlv, 1049-1053.

Albarran, J.—Neoplasmes primitifs du bassinet et de l'uretere. Annales d. Maladies d. Organes Genito-Urinaires, Paris, 1900, xviii, 1178-1187.

Stenhouse, J. W.—Septic lymphangitis along the ureters affecting the kidneys treated with antistreptococci serum recovery. Lancet, London, 1900, i, 303-304.

Rona, D.—Ueber ureteritis cystica. Monatsblat f. Urologie, Berlin, 1901, v, 321-337, 1 Taf. 5 Fig.

Kischenski, Dm. P.—Rein contracte et atrophie de l'uretere de la veine du rein et de l'uretere. Med. Obozr. Moskow, 1901, lv, 276-283, 1 fig.

White, J. A. H.—A case of renal colic attended by the passage of casts of the ureter (ureteritis membr. anacea). British Medical Journal, London, 1901, i, 14-15.

Zeit, F. R.—The pathology and bacteriology of ureteroint stinal anastomosis. New York Medical Journal, 1901, lxxiii, 756-761, 8 fig.

Straus, F.—Untersuchungen ueber Physiologie und Pathologie der Ureteren-und Nierenfunktion mit besonderer Berueksichtigung der verdunnenden Nierenthatigkeit nach Flussigkeitszufuhr. Mun-

chen. Medicinische Wochenschrift, 1902, xlix, 1217-1221.

Peters, L.—Obstruction of the ureter caused by an enlarged spleen lodged in the pelvis. American Journal of Obstetrics, 1902, xlv, 540-544.

Sante Solieri.—Obliterazione dell uretere al suc sbocco in vesica e consecutiva degenerazione cisticadelrene. Riforma Medical Roma, 1902, xviii, 291-294.

Burrage, W. L.—Report of a case of tubercular pyelonephritis, ureteritis and cystitis weight of kidneys after removal eighteen and one-half ounces. American Journal of Obstetrics, New York, 1903, xlviii, 52-57.

Cathelin, F.—Lapathologie du meat ureteral. Bulletin Medical, Paris, 1905, xix, 513-515.

D'Erchia F.—Ginecologia, Firenze, 1905, ii, 560-567.

Invagination or Prolapse of the Distal end of the ureter in the bladder. (Kansas City Index Medicus, Lancet, Jan., 1906).

Atrophic or Rudimentary Kidney. (American Practitioner and News, Sept. 15, 1904).

Peculiar Ureter. (Med. Brief, Aug., 1905).

Caecal or Blind Ending Ureter. (St. Louis Medical and Surgical Journal, March, 1904).

Ureteral Obstruction from Periureteral Cicatrices. (American Journal of Dermatology, May 5, 1904).

Obstruction of the Ureter by Normal Structure Abnormally Applied. (Regular Medical Visitor, May 15, 1904.)

Ligation of the Ureter. (Annals of Surgery, 1894).

Robinson, B.—Cysts of the ureter (cystica Ureteritis) American Journal Surgery & Gynecology, St. Louis. 1904-5, xviii, 83-86.

Adler, L.—Beitrag zur kenntnis der primaren tumoren des ureters Monatsblat f. Urologie Berlin, 1905, x, 129-142.

Courtrade, D.—Pathogenie et traitement electrique du spasme de l'uretere. Association france d'urologie proc-verb, 1905, Paris, 1906, liv, 321-336.

Borrmann, R.—Ein Fall von blindendigendem ureter mit cystischer vorwolbung in die harnblase inert mit cystenniere derselben seite Virchows

Archiv. f. Pathological Anatomie, etc. Berlin, 1906, clxxxvi, 25-55.

Lucas, D. R.—On intra-ureteral pressure and its relation to the peristaltic movements of the ureter (abstract) American Medicine, Phila., 1905, ix, 745.

Citelli.—Risposta alle note di Nussbaum e Seiffert Ueber Drusenformen (e) Die Drussen im ureter des Pferdes Anatomische Anzeiger Jena, 1905, xxvii, 524-527.

Henderson, V. E.—The factors of the ureter pressure. Journal Physiology, London, 1905-6, xxxiii, 175-188.

Ruiz, E.—Cervera y. Un caso de rinon movible hidronefrosis derecha por acodamiento del ureter. Revue Ibero-Am.decien Medical Madrid, 1906, xvi, 1-8.

BIBLIOGRAPHY.

B. MERRILL RICKETTS, Ph. B., M. D., LL. D.

1 The Negligence and Result of Vaccination, Ironton, O., June 1, 1882 (Pamphlet).

2. Lynx Rufus—Journal Cinti. Nat. Hist. Soc., April, 1882.

3 Construction of Sewers, Ironton, Ohio, June, 1882 (Pamphlet).

4 A case of Scarlatina. Med. Society, Columbus, O., Col. Med. Journal, January, 1884.

5 Internal Urethrotomy, January, 2, 1893, p. 195 Bound, Vol. 5.

6 A case of Ichthyosis Sebacea, Cinti. Lancet-Clinic, 1885, x p. 312.

7. Clinical Use of Chrysarobin, Cinti. Lancet-Clinic, 1885 xiv, 312.

8 Pityriasis Rosea. Cinti. Lancet-Clinic, 1885.

9 A case of Lichen Scrofulosis. Cinti. Lancet-Clinic, 1885, x, p. 427.

10 Pyrogalic Acud, Its Preparations and Uses. Cinti. Lancet-Clinic, 1885, x p. 39.

11 Three Cases of Carcinoma. Cinti. Lancet-Clinic, 1885, x. p. 398.

12 Case of Epithelioma Monographia Syphilitica, 1885.

13 Lupus Vulgaris. Columbus O. Med. Journal, May, 1885.

14 Treatment of Ulcer (Chronic) Leg. Virginia Med. Monthly, 1885.

15 Cincinnati Med. Soc. Discussion Plastic. Cinti. Lancet-Clinic, March 23, 1886.

16 Abscess Cerebellum (Case Specimen) Cinti. Lancet-Clinic, May 4, 1886.

17 Sponge Grafting, Cinti. Lancet-Clinic, April 13, 1886.

18 Epithelioma, Aetiology, Diagnosis and Treatment. Cinti. Lancet-Clinic, June 12, 1886.

19 Thermocautery, in Treatment of Herpes. Cinti. Lancet-Clinic, Oct. 13, 1886.

20 A Case of Morphia. Cinti. Med. Journal, Sept., 1886.

21 Psoriasis. Cinti. Lancet-Clinic., 1887, xviii, 5.

22 Oncho-gryposis. Cinti. Lancet-Clinic, 1887, xviii. p. 303.

23 Rodent Ulcer, Papillomatous Epithelioma and Lupus Erythematosis. Cinti. Lancet-Clinic. March, 1887.

24 Oidium Albicans. Cinti. Lancet- Clinic, 1887, xviii. p. 393.

25 Management of Eczema. Cinti. Lancet-Clinic, July 30, 1887.

26 Urticaria, (Capaiba). Cinti. Lancet-Clinic, Dec. 19, 1887.

27 The Relation of the Red Corpuscles to the Brain. Journ. Nat. Hist. Soc., April, 1887. Cinti.

28 Surgical Treatment of Tubercular Glands. Cinti. Journ. Med., 1888.

29 Sundry articles. Cinti. Med. Journ., 1888.

30 Circumcision From a Dermatological Standpoint. Cinti. Lancet-Clinic., 1888, xx p. 40.

31 Syphilitic Ulceration of Nose. Cinti. Lancet-Clinic, July, 1888.

32 Use of Arsenic in Dermatology. Cinti. Lancet-Clinic, May 8, 1888.

33 Squamous Eczema. Cinti. Lancet-Clinic, 1888, xxi p. 493.

34 Psoriasis. Numularis. Cinti. Lancet-Clinic. Cinti. Med. Soc., Dec. 11, 1888.

35 Dermatological Coverings of Animals and Plants. Cinti. Nat. Hist. Soc. Journ., January, 1888.

36 Treatment of Acne. Trans. Ohio State Med. Soc., 1888.

37 Eczema Infantile. Trans. Ohio State Med. Soc., 1888.

38 Naevoid Elephantiasis (Case) Cutaneous Journal, 1888.

39 Rhinoplastes and Extrophy Bladder. Cinti. Lancet-Clinic, Nov. 19, 1889.

40 Eruption (Hydrastus and Laudenum) Cinti. Lancet-Clinic, March 18, 1889.

41 External Urethrotomy. Cinti. Lancet-Clinic, 1889, xxiii, p. 593.

42 Plasto-Cosmetics in Surgery of Face. Cinti. Lancet-Clinic, 1889, xxiii, 303.

43 Pemphigus Vulgaris. Cinti. Lancet-Clinic, 1889, xxiii, 470.

44 Cremation. Med. & Surg. Reporter, Phila., March, 1889.

45 Lymphangitis. Cinti. Lancet-Clinic, 1890, xxv, 597.

46 Fifteen Cases of Gonorrhoea. Cinti. Lancet-Clinic., 1890, xxv, 11.

47 Copaiba Eruption. Herpes Lumbricales. Cinti. Lancet-Clinic, 1890, xxv, 72.

48 Extensive Naevus in A Child Three Months Old. Cinti. Lancet-Clinic, 1890 xxv, 75.

49 General Alpoecia. Cinti. Lancet-Clinic, 1890, xxv, 132.

50 Excision of The Knee. Cinti. Lancet-Clinic. 1890, xxv, 537.

51 Surgical Treatment of Epilepsy. Cinti. Lancet-Clinic, 1890, xxv, 73.

52 Radical Operation for Hernia. Cinti. Lancet-Clinic, 1891, xxvi, 41.

53 The Use and Abuse of Soap and Water. Cutaneous Journal, May, 1890.

54 Atypic Herpes Zoster Gangrenosa. Journ. Am. Med. Assn., May, 1890.

55 External Surgery of the Nose—Journ. Am. Med. Assn., May, 1890.

56 Indications for Internal Urethrotomy. Trans. Ohio State Med. Soc., May, 1890.

57 Large Doses of Kali Iodidum, St. Louis Med. Mirror, 1893, also South West, Ohio Med. Soc., 1890.

58 Experimental Research in Bone Grafting, New York State Med. Assoc., Nov. 5, 1890.

59 The Removal of Lymphatic Glands, Cinti. Med. Journ., March, 1890.

60 Osteo-penthesis Reprint from Journ. Am. Med. Assn., 1891, xii, p. 277, No. 2, B Vol. 6.

61 A Case of Talipes Equino-Varus, Journ. Am. Med. Assn., Aug. 20, 1892, p. 305, also Vol. xii, No. 2, Bound Vol. 6.

62 Scrotal Hernia—Cinti. Lancet-Clinic, Vol. 7 p. 16.

63 Early Removal of Tubercular Foci of The Bone. Journ. Mat. Med., Vol. xxi, p. 217—No. 1, Bound Vol. 6.

64 150 Circumcisions. Cinti. Lancet-Clinic, 1892 Feb. 9, Bound Vol. 5, p., 135.

65 150 Circumscisions, Cinti. Lancet-Clinic, 1892. V. p. 241.

66 Large Doses of The Iodides. Cinti. Lancet-Clinic, Vol. 7, p. 247.

67 The Surgical Treatment of Epilepsy, Cinti. Lancet-Clinic, 1891, vii, 241.

68 A Case of Sarcoma Axilla. Cinti. Lancet-Clinic, 1891, xxvi, 470.

69 Vesical Calculus. Cinti. Lancet-Clinic, 1891, xxvi, 471.

70 Fracture of The Skull and Restoration of Fragments. Cinti. Lancet-Clinic, 1891, xxvi, 729.

71 Treatment of Chronic Gonorrhoea with Yellow-Oxide. Cinti. Lancet-Clinic, 1891, xxvi.

72 Osteo-penthesis, Washington, D. C., May, 1891.

73 The Surgery of Cleft Palate, Miss. Valley Dental Assoc. Trans., March, 1891.

74 Observations on Koch's Lymph in Sixty-Three Cases. Cinti. Academy of Med. Jan., 1891, also Lancet-Clinic, Feby., 1891.

75 150 Circumcisions. Cinti. Lancet-Clinic, 1892, xxviii, 359.

76 Abscess of Cerebellum (6 cases) Following Caries Middle Ear Disease. Cinti. Lancet-Clinic, 1892, xxviii, 818.

77 Neurectomy Great Sciatic, Talipes Correction (Photo) Journ. Am. Med. Assn., May, 1892.

78 Internal Urethrotomy (36 cases) New York Med. Journ., July, 1893.

79 Niagra's Water Power. Jour. Cinti. Nat. Hist. Soc., Jan., 1893.

80 Intestinal Anastomosis (Maunsell) Jour. Am. Med. Assn., Aug 26, 1893.

81 Lupus, Its Extirpation, New York Med. Jour., Sept. 23, 1893.

82 Varicocele, (19 Operations) New York Med. Jour., June 17, 1893.

83 Early Removal of Tubercular Foci of Bone. Nour. Mat. Medica, May 12, 1893.

84 Primary Gonorrhoea and Syphilis in Children. Jour. Am. Med. Assn., Dec. 16, 1893.

85 Excision of Hip-Joint in Tubercular Disease. Jour. Gynec. & Pediatrics, January, 1894, also Cinti. Acad. Med., Nov., 1893.

86 Obliteration of Pigmentation. Jour. Am. Med. Assn., Jan. 20, 1893.

87 External Urethrotomy. Med. Record, N. Y., June, 1893.

88 A Staff of Consultants. Times Star., Dec. 15, 1893.

89 Traumatic Periostitis. Railway Age, March 7, 1894.

90 Circular Saw Injury, (Photo) Med. News, Phila., Jan. 1, 1894.

91 Tubercular Syphilis Nose (Photo's) Sarcoma General (Photo's) Cutaneous & Genito-Urin. Jour., April 1, 1894.

92 Intestinal Anastomosis. Ann. Surg., April 1, 1894.

93 Omental Tumor. St. Louis, 1894.

94 Enchondroma of Neck (Photo's) Times & Register, Jan. 6, 1894.

95 Last 50 of a Series of 200 Circumcisions. New York. Med. Jour., March, 1894.

96 Six Thigh Amputations and Hydrocele. West Va. Med. Jour., Sept. 1, 1894.

97 Small-pox and Vaccination. Cinti. Med. Jour., March, 1894.

98 Epithelioma of Lower Jaw, St. Louis Med. Mirror, April, 1894.

99 Extrophy of Bladder. New York Med. Record, April 14, 1894.

100 An Interesting Case (Tubercular Foci) Mo. Med. Monthly. April 1, 1894.

101 Epithelioma Over Sternum. Med. Progress Louisville, Ky. May 1, 1894.

102 The Surgical Uses of Cocaine. Med. & Surg. Reporter, April 14, 1894.

103 Fifty Cases of Rectal Surgery. Journal Rectal Surg. Louisville, Ky., July 1, 1894.

104 Hip-Joint Amputation. West Va. Med. Jour., Nov., 1894.

105 The Lengthening and Shortening of Bones. L. Ollier. Lyons France. Translated by B. M. R. Cinti. Med. Jour., March 1, 1894.

106 The Removal by trephine of fluid as the result of acute cerebral meningitis, with report of a case and experiments upon the lower animals. New York State Med. Assn., Oct., 1894.

107 New Surgery in The So-Called Medical Cases. Marion, Ohio, Dec. 21, 1894.

108 Castration for Hypertrophied Prostate. Dec. 2, 1894.

109 Removal of Head of Femur From Lesser Sciatic Notch, Dec. 15, 1894.

110 Trephine in Acute Cerebral Meningitis, Dec. [illegible]94.

111 Colotomy and Kraske Operation Cinti. Lancet-Clinic, xxxiii, 679.

112 Hydrocele Radical Operation. West Va. Med. Jour., Oct., 1894.

113 Hygroma, Cinti. Acad. Med., Dec 11, 1895, also Lancet-Clinic, xxxv, 724.

114 The Management of Tubercular Subjects. Penna. Soc., May 14, 1895.

115 Dislocation and Double Fracture of Upper Third of Humerus, Jour. Am. Med. Assn., May, 1895.

116 Malignant Growths of Superior Maxillary Bone, St. Louis Med. Mirror, March 1, 1895.

117 Modern Surgery of Serous Cavities. Nat. Assn. Railway Surgeons; Cent. Ohio Med. Soc., Columbus, Ohio, Feb. 7, 1895.

118 Cerebral Cyst, Removal; Typhoid Ulcer Operation, Cinti. Lancet-Clinic, April 6, 1895.

119 Flat Foot, Its Correction and Comparative Study, With The Foot of The Orang, Chimpanzee, Gorilla and Babboon. Am. Med. Assn., Aug. 3, 1895.

120 Double Club Feet and Hands. Children's Section. Am. Med. Assn. Journal, Oct. 10, 1895.

121 Lupus Treated by Galvanism. Am. Med. Assn. Jour., May 7-10, 1895.

122 Reply to Medical Record Editorial, On Circumcision. Med. & Surg. Reporter, Phila., Feb. 21, 1895.

123 Site of Inoculation (Vaccinia). Cinti. Lancet-Clinic, April 20, 1895.

124 Neuralgia of The Fifth Nerve. Cinti. Acad. Medicine, March, 1895.

125 Rupture of the Left Lateral Ventricle. Cinti. Acad. Medicine, April, 1895.

126 New Operation for Hemorrhoids and Prolapsed Rectum. Phys. & Surgeon Ann Arbor, October, 1895.

127 The Cranectomies. Brain Surgery; Read before Detroit Med. Soc., Sept. 16, 1895.

128 Exsection of Head of Humerus and Jaws, for Ankylosis. Cinti. Lancet-Clinic, October 20, 1895.

129 The Removal of Lymphatic Glands. Cinti. Med. Jour., March, 1890.

130 A Radical Operation for Prolapsed Rectum and Hemorrhoids, Chicago Academy Medicine, Feb. 14, 1896.

131 The Advantages and Disadvantages of the Bicycle. Cinti. Tribune, October 6, 1895.

132 Enchondritis Surgical Treatment. Jour. Am. Med. Assn., Aug. 22, 1896.

133 Sanitation of Work Shops and Public Conveyances. Cinti. Lancet-Clinic, 1896, xxxvi, 396.

134 Vivisection. Cinti. Commercial Gazette, Nov. 10, 1895.

135 Anal Fistula Peritonitis Laparotomy Recovery. Cinti. Lancet-Clinic, April 7, 1896.

136 Surgery of the Chest, Report of Cases. Cinti. Lancet-Clinic, 1896, xxxvii, 237.

137 Twelve Deaths—Total Number of Fatalities in 12 years. (1) Strangulated Omental Tumor; (2) Sarcoma of lower End of Femur; (3) Colotomy; (4) Intestinal Anastomosis; (5) Post. Dislocation of Femur; (6) Typhoid ulcer; (7) Appendicitis; (8) Cystic Kidney; (9) Tuberculosis sacro-Illiac; (10) Hip-Joint Amputation; (11) Two Tracheotomies-Cinti. Lancet-Clinic, 1896, xxxvii, 264.

138 Trifacial Neuralgia, Ligation of Common and External Carotid Report of Case 97 years of Age; Virginia State Med. Soc., Rockbridge Alum, Springs. Sept. 8-10, 1896.

139 Surgical Melange: (1) Ligation of Brachial; (2) Gunshot Wound of Facial Artery; (3) Talipes; (4) Hypertrophied Prostate 3 cases; (5) Sarcoma of Sacrum. Miss. Valley Med. Assn., Sept. 15, 1896.

140 Eczema Chronicum and Ethyl Chloride (Bougie) Cinti. Lancet-Clinic, 1896, xxxvii, 378.

141 Branchial Cysts, Extirpation, Recovery. Cinti. Lancet-Clinic, 1896, xxxviii, 36 Discussion 40.

142 Surgical Melange: (1) Craniotomies; (2) Tracheotomy lace-hook; (3) Murphy Button Gut Strangulation; (4) Appendicitis Suppuration 4 Cases; (5) Tubercular Fibula Amputation; (6) Amputation Middle Thigh. Read before North East. Med. Assn., Kentucky, Carlisle, Jan. 21, 1897.

143 Ligation Common Carotid for Trifacial Neuralgia. Surg. Sect. Jour. Am. Med. Assn., June 1-5, 1897.

144 Craneotomies Report of Four cases. Cinti. Lancet-Clinic, July 10, 1897.

145 Removal of Upper and Lower Jaws Through the [illegible] thout Incision. Railway Surg. Chi- 337.

146 Appendicitis 4 Cases. Cinti. Lancet-Clinic, July 17, 1897.

147 Rectal Prolapse Hemorrhoids Mitchell Dist. Med. Soc., July 8-9, 1897.

148 Appendicitis Olympic Springs Bath Co., Ky., July 10, 1897.

149 Brain Surgery for Epilepsy Milwaukee Med. Jour., 1896, iv 92-94.

150 Trifacial Neuralgia, Ligation of Common Carotid and External Carotids Report of a Case aged 97 years Virginia Med. Semi-Monthly, Richmond, 1896-7, i, 326-328.

151 Three Cases of Appendicitis. Cinti. Lancet-Clinic, 1897, xxxix, 330-332.

152 Lace-Hook In Trachea, Tracheotomy. Columbus Med. Journ., 1897 xviii, 586.

153 Foreign Body in Trachea, Cinti. Lancet-Clinic, 1897, xxxviii, 139.

154 Abdominal Incision for Ascites. Cinti. Lancet-Clinic, 1897, xxxix, 347.

155 Aneurism of Aortic Arch, Surgical Treatment, by Ligation of Right Common Carotid and Sub-Clavian Arteries Journ. Am. Med. Assn., August 13, 1898.

156 Deaths, Surgical Causes: (1) Gangrene Thigh Amputation; (2) Brain Abscess; (3) Ovarectomy Double; (4) Intestinal Obstruction; (5) Fibro-Sarcoma of Uterus; (6) Lithotomy; (7) Gall-Bladder Rupture; (8) Brain Abscess; (9) Fracture Base of Skull; (10) Meningitis Cerebral—Cinti. Lancet-Clinic, 1898 xl, 571-575.

157 Trifacial Neuralgia, Ligature External and Common Carotid. Ohio State Med. Socy., May 4-6, 1898.

158 Hypertrophied Prostate, Nine Cases. Cinti. Lancet-Clinic 1898, xl, 481.

159 The Dermal Coverings of Animals and Plants, A Short Resume of Various Authors. Cinti. Lancet-Clinic, Aug. 20, 1898.

160 Serpents and Their Venom, Copperhead, Corral, & Rattlesnake. Cinti. Lancet-Clinic, 1898, xli, 491-494.

161 Surgical Melange; (1) Empyema of Chest; (2) Empyema of Chest; (3) Abscess of Lung; (4) Ununited Fracture of Humerus; (5) Septum Nasi Protrusion; (6) Septum Nasi Protrusion; (7) Sarcoma of Neck; (9) Sarcoma Popliteal Space (10-

Anal Fistula; (11) Anal Fistula. Cinti. Lancet-Clinic.

162 Case History, Photograph. Dermatological Section. Am. Med. Assoc., June 6-9, 1899.

163 Surgical Appendicitis. Ohio State Med. Soc., May, 1899, Vol. xii, No. 11, p. 221.

164 Heart of Tortoise. Virginia Med. Monthly, March 10, 1899.

165 Rectal Sarcoma, Excision and Subsequent Colotomy. Am. Proctological Assoc., June 6, 1899.

166 Cranial Injuries of Childhood, Their Treatment. Ohio Pediatric Soc., May 9, 1899.

167 Cholangistome, Presented to New York Soc. Med. Assoc., Dec. 25, 1899, Vol. v, No. 12, p. 895.

168 Femoral Artery and Vein Their Destruction With Loss of Leg. Jour. Am. Med. Assn., Aug., 1899.

169 Dermatology, A Record of 300 Clinical Cases, Cincinnati, 1893; A Report of 300 Dermatological Cases, 1889; Record of Small-pox cases in Ironton, March 15, 1881 to June 15, 1882. Notes of Lectures on Medicine. Translation of Dr. Ollier's work.

170 Hand-Book—What To Do In Case of Accident. 1893.

171 An Operation for Inguinal Hernia. Cinti. Lancet-Clinic, 1898, ns. xli, 433.

172 Sarcoma in Patients With a History of Syphilitic Infection. Cinti. Lancet-Clinic, 1898, ns. xli, 456-458.

173 A Case of Ununited Fracture of The Humerus. Cinti. Lancet-Clinic, 1898, ns. xli, 508.

174 Translation of Dr. Ollier's Work: Bone Resection.

175 Specimens Demonstrating the operation of Gastro-Cholecystotomy; End to End Anastomosis of gut, etc. Bound Vol. ii p. 302.

176 Report of a Case of Talipes Equino-Varus. Jour. Am. Med. Assn., Vol. 9, No. 8, p. 219. Bound Vol. ii.

177 Circumcision Last 50 of Series of 200. New York Med. J. April 7, 1894 p. 431 Bound Vol. 49.

178 Bloodless Amputation at the Hip-Joint Bound Vol. iii p. 32, 1898.

179 Direct Fixation of Fractures (Symposium) St. Louis. Dr. Louis Bauer, Editor. 1891.

180 Operation for Gall-Stones. Cinti. Lancet-Clinic, 1899 ns. xlii, 237-239.

181 Case History, and Photograph (Sarcome de la Region anterieure du Thorax et de l'aisse lle droit) J. Am. Med. Assn., 1900, xxiv, 76-77, 1 fig.

182 Ovarian Pregnancy, Report of a Case at Full Term. Am. J. Surg. & Gynecol., St. Louis, 1900, xiii, 146-148.

183 Specimens of Gall-Stones. Cinti. Lancet-Clinic, 1900 xliv, 369-370.

184 Specimens of Gall-Stones. Cinti. Lancet-Clinic, 1900 xlv, 594.

185 Case of Ectopic Pregnancy. Cinti. Lancet-Clinic, 1900, xliv, 370-371.

186 Sarcoma of The Kidney. Cinti. Lancet-Clinic, 1900, xliv, 364.

187 Submucous Ligature For Rectal Hemorrhoids and Prolapse. Med. Rev. of Rev. N. Y., 1900, vi, 512-519, 6 fig.

188 Some Anomalies of The Uterus. Cinti. Lancet-Clinic, 1901, xlvii, 554.

189 Hernia, Radical Operation With Wire Mattress (Phelps) Trans. New York State Med. Soc., 1901.

190 Inguinal Hernia. Cinti. Lancet-Clinic, 1901, ns. xlvi, 105.

191 Appendicitis (Surgical Treatment) Cinti. Lancet- Clinic, 1901 ns. xlvi, 189-192.

192 The Appendix Vermiformis and Caecum A Comparative Study. 1814-1901 J. Am. Med. Assn., 1901, xxxvi 1556.

193 Discussion on Specimens of Tubercular Kidney and Bladder Cinti. Lancet-Clinic, 1902, ns. xlix 39.

194 A Brief Resume of The Treatment of Tuberculosis. Cinti. Lancet-Clinic, 1902 ns. xlix, 140-141.

195 Surgery of The Prostate and Diaphragm Cinti. Lancet-Clinic, 1902, ns. xlix, 369-376; 399-405; 431-434.

196 Appendicitis. Cinti. Lancet-Clinic, 1902, ns. xlviii, 573-576.

197 Surgery of The Heart. Cinti. Lancet-Clinic, 1902.

198 Ligation of Arteries Cocaine Anaesthesia Interstate Med. J. St. Louis, 1902, ix, 188-191.

199 Ligation of Arteries Cocaine Anaesthesia Cinti. Lancet-Clinic, 1902, ns. xlviii, 403-405.

200 Surgery of Penetrating Wounds of Lungs and Heart (Experimental) Virginia Med. Semi-Monthly Richmond, Va., 1902-3, vii, 508-511.

201 Exhibition of a Patient Upon Whom Operation For Floating Kidney Was Performed. Cinti. Lancet-Clinic, 1903 ns. 50, p. 63.

202 Specimen of Foreign Body Removed From The Intestine, Supposed to be a Piece of Carbon. Cinti. Lancet-Clinic, 1903, ns. 50, p. 63.

203 Lung Surgery. Cinti. Lancet-Clinic, 1903, ns. vol. 50, p. 1-9.

204 Lung Surgery Historical and Experimental Abstract Med. News, N. Y., 1903, lxxxiii 683-689.

205 Surgery of The Pancreas (Historical and Experimental) Med. Fortnightly, St. Louis, 1903, xxiii, 299-305.

206 The Surgery of The Heart, New York Med. J., 1903, lxxvii, 918-963; 1148-1204.

207 Typhoid Gangrene of The Lower Extremities, 134 Cases of Spontaneous and Surgical Amputations, An Historical Resume. Cinti. Lancet-Clinic, 1903, ns. Vol. 51, pp. 553; 580.

208 Surgery of The Thyroid, Kansas City Med-Index, Lancet, 1903, xxiv, 389-436.

209 Surgery of The Diaphragm. Virginia Med. Semi-Monthly Richmond, 1903-4, viii, 87-90.

210 Typhoid Gangrene of The Lower Extremities, 134 Cases Spontaneous and Surgical Amputations, an Historical Resume. Buffalo Med. J., 1903-4, ns. xliii, 361-364.

211 Ibid—Columbus Med. J., 1904, xxviii, 11-13.

212 Ibid—Med. & Surg. Monitor Indianapolis, 1904, vii, 28-30.

213 Ibid—Am. J. Surg. & Gynec., St. Louis, 1903-4, xvii, 117.

214 Ibid—Denver Med. Times, 1903-4, xxiii, 382-385.

215 Ibid—Virginia Med. Semi-Monthly, Richmond, Va., 1903, viii, 562-564.

216 Surgery of The Prostate Pancreas Spleen Diaphragm Thyroid Gland and Hydrocephalus (Volume) 1904.

217 Surgery of Hydrocephalus An Historical Review Am. Med., Phila., 1904, vii, 783-787.

218 Surgery of Hydrocephalus, Col. Med. J., 1904, xxviii, 64-67.

219 The Surgery of The Heart and Lungs, etc., New York, 1904, pp. 562, 132 plates.

220 Cholecystotomy, Cinti. Lancet-Clinic, 1904, ns: liii, 432.

221 Excision of Elbow-Joint for Traumatic and Inflammatory Arthritic Ankylosis. Am. J. Surg. & Gynec., St. Louis, 1904-5, xvii, 134-138, Also Louisville J. Med. & Surg., 1904-5, xi, 318..

222 Fracture Deformities of The Lower Leg in Childhood Illustrated by Skiagraphs, St. Louis Med. Rev., 1905, lii, 542-544..

223 Rupture of the Gall-Bladder Spontaneous and Traumatic With and Without Operation An Historical Review of 273 Cases. St. Louis Med. Rev., 1905, li, 108-233-276-456-476-497; lii 4; 25.

224 Excision of the Elbow-Joint for Traumatic and Arthritic Ankylosis Abstract, St. Louis Med. Rev., 1905,li, 437, also Trans. West Surg. & Gynec. Assoc., 1905.

225 Cholecystotomy and Nephrectomy for Gall-Stones and Pyonephrosis (Tubercular) Cinti. Lancet-Clinic, 1905, ns. liv, 139.

226 Vesico-Rectal Anastomosis. New York Med. J., 1905, lxxxi, 162.

227 Ovarian Angeioma, New York Med. J., 1905, lxxxi, 163.

228 Dr. Tuholske's Case of Malformation of The Bladder, St. Louis Med. Rev., 1905, li, 178.

229 Specimens of Tubercular Kidneys. Cinti. Lancet-Clinic, 1905, ns. liv, 532.

230 Haematoma of The Ovary. Cinti. Lancet-Clinic, 1905, ns. liv, 687.

231 Diagnosis and Treatment of Gall-Stones Kentucky Med. J., Louisville, 1905-6, iii, 550.

232 Cardiac Stimulation for Suspended Animation by Direct Digital manipulation a Supplementary Report to Surgery of The Heart and Lungs (Abstract) Col. Med. J., 1906, xxx, 308-311, also Colorado Med. J., 1906, xii, 325-328.

233 Cardiac Stimulation for Suspended Animation by Direct Digital Manipulation Illustrated by Diagrams and Case Reports Am. Med. Comp., Toledo, 1906, xix, 177-180; Buffalo Med. J., 1905-6, lxi, 708.

234 Trigemnial Neuralgia Surgical Treatment An Historical Resume. Cinti. Lancet-Clinic, 1906, ns. lvi, 597-608, also Nashville J. Med. & Surg.,

19

Chap-
Anen-
sub-

pp. each

1906, xcviii, 97-101, also Virginia Med. Semi-Monthly Richmond, 1906-7, xi, 12-14.

235 The Diseases, Diagnosis and Surgical Treatment of the Right Upper Abdominal Cavity An Historical Resume, Cinti. Lancet-Clinic, 1906, lxvi, 201-242.

236 Cardiac Stimulation for Suspended Animation by Direct Digital Manipulation Med. Rev. of Rev., N. Y., 1906, xii, 848-850.

237 Ibid—Trans. Surg. Sect. Am. Med. Assoc., 1906, Volume.

238 Feminalities. Cinti. Lancet-Clinic, 1907.

239 Limiting Population, Cinti. Lancet-Clinic, 1907.

240 Villous Papilloma of The Rectum. New York Med. J., 1907, lxxx.

241 Surgery of The Ureter, St. Louis Med. Rev., 1907-8, Serial. Bound Volume 100 Copies, An Historical Review. 1908.

242 An Historical Review of Papilloma and Adenoma American J. Dermatology, March 1, 1908.

243 Appendicitis and Typhoid Fever, four cases. Cinti. Lancet-Clinic, Feb. 22, 1908.

244 The Disposition of the Appendicular Stump. Cinti. Lancet-Clinic, March 28, 1908.

245 Intestinal Obstruction Exploration, Western Surgical and Gynecological Association ,(Trans.), St. Louis, Mo., Dec. 30-31, 1907.

246 Capillary Varicosity of Rectal Mucosa, American Proctologic Association (Trans.), Chicago, June 1st, 1908.

247 Surgery of Hare Lip and Cleft Palate (Illustrated). Transactions Ohio Valley Med. Association, 1908.

248 Protracted Birth of Second Intra-Uterine Twin. A Resumé Biologically Considered. Transactions Miss. Valley Med. Asso., 1908.

249 Surgery of The Prostate Pancreas. Spleen Diaphragm Thyroid and Hydrocephalous (A Resumé). 500 bound autograph copies, 250 pp. each, 1904.

In Preparation.

Surgery of Apoplexy (A Resumé) Forty Chapters and sub-chapters. 200 pp. Surgery of Aneurism (A Resumé) Forty-five chapters and subchapters. 200 pp.